CIVIL ENGINEERING

Volume 1

October 1930—December 1931

Published by the
American Society of Civil Engineers
33 West 39th Street, New York City

Issue	Page Numbers
October 1930	1–68
November	69–156
December	157–236
January 1931	237–364
February	365–460
March	461–588
April	589–688
May	689–784
June	785–904
July	905–984
August	985–1064
September	1065–1160
October	1161–1236
November	1237–1320
December	1321–1436

INDEX TO CIVIL ENGINEERING

October 1930—December 1931

SUBJECT INDEX

ACCIDENTS

A close call ... 1218
Rope friction saves a bridge. E. K. Morse ... 1416

ADVERTISING

Does the engineer respond to advertising? Morris Knowles ... 944

AERIAL SURVEYING

See Surveying, Aerial

AERONAUTICS

Commemorative aeronautic meeting ... 439
"Developing Aerial Transport." A Symposium. V. P. Conroy, George C. Kenney, Kenneth Whiting ... 827
Guggenheim Medal awarded ... 884
See also Airplane Carriers: Airplanes: Airways

AGRICULTURAL ENGINEERING

Division of Agricultural Engineering of the U.S. Department of Agriculture ... 501
News of Bureau of Agricultural Engineering ... 1039

AIRPLANE CARRIERS

Aviation facilities on naval carriers ... 834

AIRPLANES

"Developing Aerial Transport." A Symposium. V. P. Conroy, George C. Kenney, Kenneth Whiting ... 827

AIRWAYS

"Developing Aerial Transport." A Symposium. V. P. Conroy, George C. Kenney, Kenneth Whiting ... 827

ALLOYS OF IRON RESEARCH

Purpose of ... 963

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE

Meeting ... 1044

AMERICAN ARBITRATION ASSOCIATION

Arbitration Act introduced in State Legislatures by ... 668

AMERICAN ENGINEERING COUNCIL

Active in aiding employment ... 211, 752, 1040
Civil engineering news of the government ... 1039
Meetings ... 439, 957
Proposes establishment of single court of patent appeals ... 964
Report of Bridge Legislation Committee ... 175
Resolution on flood control ... 343

AMERICAN RADIO RELAY LEAGUE

Work of ... 664, 748

AMERICAN SOCIETY FOR TESTING MATERIALS

Exhibit of testing apparatus ... 964
Officers elected ... 1044

AMERICAN SOCIETY OF CIVIL ENGINEERS

Annual Convention (1930) ... 135, 137
(1931) ... 754, 875, 876, 955, 1037, 1139
Annual Meeting (1931) ... 211, 337, 557, 561, 562, 563
(1932) ... 1411
Authors, information for ... 955
Awards
Alfred Noble Prize ... 138, 338, 563, 1293
Am. Soc. C.E. for papers ... 136, 336, 337, 1292, 1294
Columbia University Scholarship ... 754
Freeman Fund ... 345, 754, 965
Rudolph Hering Medal ... 339, 879
Student prize winners ... 958, 1041
Badge ... 143, 216, 564, 1294
Board of Direction
Abstract of minutes of meetings ... 135, 558, 560, 751, 1038, 1291
Excerpts from Annual Report ... 562
Pledges support to President Hoover 1295
Resolution on death of George F. Swain ... 1295
Resolution on mapping and stream flow programs ... 1294
Resolution on publishing *Water Supply Papers* ... 212
Resolutions on registration of engineers ... 751, 1039
Civil Engineering
"A Great Progressive Step" ... 2
Annual Meeting program in ... 1411
Index ... 1408
Making meetings available ... 339
Requests for first issue ... 337, 1214
Subscriptions ... 563
Earths and Foundations Committee
Presents report ... 958
Research work ... 1296
Employment of Engineers in Russia Committee Report ... 755
Employment program ... 1297
Engineering Employment Committee
Salary Study ... 47, 338, 565
Engineering-Economics and Finance Division, organization, and activities ... 561, 752, 879, 956
Engineers
Obligations to former employers ... 48
Studies by committees on compensation of ... 47, 210, 338, 565, 1211
Executive Committee Meetings ... 46, 558
Fall Meeting (1930) ... 46, 135, 137, 337
(1931) ... 1039, 1138, 1211, 1291, 1293, 1296
Fees Committee study on consulting fees 210
Filtering Materials Committee Report ... 1388
Gavels and sentiment ... 663
James Laurie and the formation of the Society ... 220
Local Sections
New ... 565
New York Section changes name ... 875
News of ... 50, 140, 217, 340, 436, 566, 664, 758, 879, 958, 1042, 1141, 1214, 1299, 1413
Mail ... 216, 1141
Manuals
Manuals have a purpose ... 211
Manuals nos. 4 and 5 published ... 48
Proposed manual on city planning ... 130
Membership
Applications ... 1041
Change in membership qualifications 136
Engaged in Society work ... 567
Exempt from dues ... 339
Grade changes ... 57, 145, 224, 347, 442, 570, 669, 763, 884, 966, 1047, 1145, 1220, 1304, 1417
Growth of ... 434, 955
Honorary degrees for ... 963
Honorary members elected ... 1406
Honored by Greece ... 1045
How members receive more from Society than they contribute ... 757
Obituary of noted members ... 138, 216, 564, 667, 877, 1040, 1295, 1407
Oldest members ... 138, 215
Paid up ... 215
Personal aspects of Society membership ... 1407
Professional records ... 53
Professional standing of Junior Members ... 133
Vocations ... 344
Warning to ... 668, 876
What the Society can do for the Junior Member ... 333
Memoirs ... 49, 755, 1041, 1296
New Jersey Sewage Experiments Committee Progress Report ... 860
Officers
Final ballot (1931) ... 212, 433
Visits of ... 211, 434, 879
Official Nominees
Brief biographical sketches of ... 213, 1409
For 1931 ... 136, 137, 213
For 1932 ... 1139, 1296, 1410
Francis Lee Stuart (President) ... 432
Herbert S. Crocker (President) ... 1291
Organization Chart ... 556
Power Division program ... 955
Proceedings
Preview of ... 50, 139, 217, 339, 435, 565, 666; 760, 1042, 1140, 1213, 1412
Goes out on time ... 433
In review ... 877
Summer schedule ... 956
Professional Conduct Committee presents hypothetical question ... 1297
Public speaking rules ... 338
Publications
Committee report ... 750
Discussion: Morris Knowles ... 944
Papers in print ... 222
Policy for ... 46
Rainfall data available ... 761, 963
Review of ... 1212
See also names of publications
Royal Institution of Great Britain receives greetings from Society ... 1143
Salaries Committee Report ... 1211
Sewage Works Operation and Control Committee Report and discussion ... 91, 94, 331, 332, 553
Society Representatives ... 49, 138, 215, 434, 564, 663, 877, 956, 1040, 1139, 1212, 1294, 1407
Spring Meeting (1931) ... 433, 564, 662, 752, 875, 884
(1932) ... 754
Street Thoroughfares Manual Committee Report and Discussion ... 1125, 1398
Student Chapters
Conference ... 877
Contact men for ... 47
Dues in Society for graduating students remitted ... 761
Lectures for ... 216, 1211, 1297
New ... 565, 877
News of ... 52, 219, 438, 567, 665, 881, 960, 1043, 1141, 1414
Student prize winners ... 958, 1041
Substructure Engineering Committee appointed ... 1212
Technical Divisions
Executive committees ... 212, 563
Manual of Procedure ... 878
Revised methods for nominating officers ... 879
See also names of Technical Divisions
Technical Procedure Committee activities ... 47
Transactions ... 54, 223, 564, 664, 956, 1214, 1295
United Engineering Trustees, Inc.
Relation of Society to ... 654
Verein Deutscher Ingenieure receives greetings from Society ... 964, 1040
Weather Data Committee authorized and appointed ... 564, 876
Wind Bracing in Steel Buildings Committee Report and discussion ... 478, 700, 870, 951, 952, 953, 1033, 1131, 1209, 1289
Year Book (1931) ... 664

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Art exhibition by engineers at Annual Meeting of ... 343
New officers elected ... 221

AQUEDUCTS

"Byzantine Aqueduct Still in Use." Waldo E. Smith ... 1249
"Colorado River Aqueduct." F. E. Weymouth ... 371

ARBITRATION

Act introduced in State Legislatures ... 668
"Arbitration in Public Works Contracts." A Symposium. Charles H. Stevens, P. A. Beatty ... 847
Discussion: 1035

ARCHES

"Erecting the World's Largest Roof." Wilbur J. Watson ... 71
See also Bridges

ARCHITECTS

Personnel on building projects ... 546
Wisconsin Board of Examiners of Architects and Engineers ... 1415

ARCHITECTURE

"Rope Strands for Long Suspension Span." D. B. Steinman..... 1087
Discussion: 1400, 1401
Shall civil engineers lose the right to design buildings? Morris Kampf.... 945
Should engineers practice architecture? 1286

ART

Art by Engineers..... 343

ASPHALT

"Asphaltic Emulsions for Economical Highways." C. L. McKesson..... 1255

ASSYRIAN ENGINEERING

See Engineering History

AUTOMOBILES

"Detroit Builds Highways for the Future." Leroy C. Smith..... 939
"Factors in Successful Highway Operation." A Symposium. William J. Fox, E. E. East, L. I. Hewes, W. W. Crosby, Jacob L. Crane, Jr., Jay Downer, W. W. Horner, Daniel L. Turner..... 1118
Discussion: 1398, 1399

AVIATION

See Aeronautics

AWARDS

American Superpower Corporation..... 143
Clausen Medal.....143, 568
Florence Nightingale Institute..... 963
Guggenheim Medal..... 884
John Fritz Medal.....143, 1294
Lincoln Electric Company..... 346
Washington Award.....568, 667
See also American Society of Civil Engineers—Awards

BEACHES

"Sand Movement and Beach Erosion." E. J. Dent..... 821

BEAMS

"Computing Moments in Continuous Beams." L. C. Maugh..... 202
Design of welded buildings. Leonard C. Jordan..... 864
Discussion: Anthony S. Coombs, 1034; H. L. Doolittle, 1136
"Graphical Spacing of Stirrups in Concrete Beams." Odd Albert..... 1395
"Short Cuts in Designing Reinforced Concrete Beams." Odd Albert..... 646

BLASTING

"Blasting a Precast Dam Into Place." C. P. Dunn.....159, 334
Discussion: 335

BLUEPRINTING

"Conservation in Blue Printing." F. J. Trumpour..... 644

BREAKWATERS

"An Unusual Sea Wall Achievement." C. M. Cram..... 409

BRIDGE CLEARANCES

"Bridge Clearances Over Navigable Waterways." J. F. Coleman..... 1364
"Bridges Over Navigable Waters." Report of Bridge Legislation Committee American Engineering Council. H. S. Crocker, V. H. Cochrane, A. H. Fuller, A. P. Greensfelder, F. M. Gunby, J. L. Harrington, D. B. Steinman..... 175
More clearance under drawbridges. Augustus Smith..... 1283
Public hearings held.....879, 1217

BRIDGE PIERS

"A Unique Bridge Over a Unique River." C. D. Purdon..... 382
Discussion: 661, 862, 863, 954
"Longest Continuous Railroad Trusses Yet Constructed." Wilson T. Ballard 536

BRIDGES

"A Deck Slab for Long-Span Bridges." Jack Davidon..... 1026
"A Successful Highway Toll-Bridge Project." Marshall Pitney..... 194
"A Unique Bridge Over a Unique River." C. D. Purdon..... 382
Discussion: F. G. Jonah, 661; J. P. Snow, 862; W. H. Kirkbride, 863; J. M. Johnson, 954
"Great Min River Irrigation Project." E. W. Lane..... 397
Discussion: 863, 951
"Increasing the Vehicular Capacity of Manhattan's Bridges." Edward A. Byrne..... 933
Discussion: W. L. Lowe-Brown, 1207.
"Lake Union Bridge Completed." T. G. McCrory..... 1092
"Longest Continuous Railroad Trusses Yet Constructed." Wilson T. Ballard..... 536
"Rope friction saves a bridge. E. K. Morse..... 1416
"Rope Strands for Long Suspension Span." D. B. Steinman..... 1087
Discussion: George B. Herington, 1400; Olaf Laurgaard, 1401
"Simple Model Checks Indeterminate Structure." J. Charles Rathbun.... 131
The Bureau of Public Roads..... 494
Washington Bridge, Providence, R.I., dedicated..... 142
See also Trusses: Viaducts

BRIDGES (MOVABLE)

More clearance under drawbridges. Augustus Smith..... 1283
"Movable Bridges." Otis E. Hovey..595, 747
Discussion: Edward Haupt, 1029

BRONZE

History of human endeavor portrayed in..... 1216

BUILDINGS

"An Unusual Framing Method." H. S. Woodward..... 542
"Arc Welding on Steel Buildings." Frank P. McKibben..... 37
Discussion: 134, 205, 206, 334, 426, 550
"Bank of Manhattan Company Building." Henry V. Spurr..... 472
Discussion: David C. Coyle, 743; Albert Smith, 871; S. B. Punyagupta, 1289
"Cleveland Railroads Dedicate Union Terminal." H. D. Jouett..... 77
Discussion: 546
"Modern Factory Built in Northern Korea." Wells N. Thompson..... 1275
"New York's Tallest Skyscraper." H. G. Balcom..... 467
Discussion: N. A. Richards, David C. Coyle, 743; S. B. Punyagupta, 1289
Rensselaer names buildings for graduates 1415
"Safeguarding Industry Against Fire." H. E. Magnuson..... 392
Discussion: 862
"Twelve-Month Construction." James S. Taylor..... 322
Discussion: 551, 748, 749, 874, 946
"Wind Bracing in Tall Steel Buildings." Progress Report of Sub-Committee of Structural Division on Wind Bracing in Steel Buildings. C. R. Young, Clyde T. Morris, N. A. Richards, Francis P. Witmer..... 478
Discussion: 700, 870, 951, 952, 953, 1033, 1131, 1209, 1289

BUTTRESSES

"Recent Advances in Buttress-Type Dams." Calvin V. Davis..... 387

BYZANTINE ENGINEERING

See Engineering History

CABLES

"Rope Strands for Long Suspension Span." D. B. Steinman..... 1087
Discussion: 1400, 1401

CAISSONS

"Foundation Problems and Their Solution." A Symposium. L. R. Viterbo, A. C. Everham, W. J. Newman, S. W. Bowen, O. E. Mogensen..... 301
Discussion: 654, 749, 868, 947
"Marine Oil Well Construction." T. Farrance Davey..... 721

CANALS

All American Canal..... 8
"Controlling Floods in China." E. W. Lane..... 165
Discussion: 328, 420
"Ingenuity of the Ancient Chinese." E. W. Lane..... 17
Discussion: 134, 327, 328, 420, 649
"Sand Trap for Canals Works on Vortex Principle." R. L. Parshall..... 419
See also Waterways

CAR DUMPERS

"Electrical Operation of Car Dumper." C. S. Albright and R. E. Rice..... 103
"Heavy Duty Wire Ropes and Sheaves." B. R. Leffler..... 107
Discussion: 110, 111, 209, 547
"Loading Six Million Tons of Coal." J. A. Stocker.....99, 207
"Structural Design and Details." (Car dumper at Toledo, Ohio.) Wendell P. Brown..... 105
Discussion: Ed. Linders, 206

CAST IRON

Water pipe cast in 1817..... 883

CEMENT

"Basic Principles of Concrete Making." F. R. McMillan..... 601
Discussion: 944, 1029, 1030, 1031, 1132
"Researches in Concrete Aid the Engineer." H. F. Gonnerman..... 727

CERTIFICATION OF ENGINEERS

See Engineers and Engineering

CHAMBERS OF COMMERCE

Public spirited engineers..... 53
Discussion: 134
Recalling the Pan-American Chamber of Commerce..... 1403

CHANNELS (WATERWAYS)

"Better Control of the Lower Mississippi." J. P. Kemper..... 1021
Discussion: 1208, 1404
"Developing the Upper Mississippi." A Symposium. Hibbert M. Hill, Lenvik Ylvisaker..... 1352
"Flood Control and Channel Maintenance on the Lower Mississippi River." Lytle Brown..... 815
Discussion: 1028
"Improving the Brazos River." Milo P. Fox..... 287
Discussion: 426, 740, 741
See also Water, Flow of, in Open Channels

CHIAO-TUNG UNIVERSITY RESEARCH INSTITUTE

Requests assistance in research..... 956

CHINESE ENGINEERING

See Engineering History

CITIES

"Large Turnover in City Managerships." Arthur Richards..... 641
"Problems of a Large City." A Symposium. W. F. Gephart, E. R. Kinsey, A. P. Greensfelder, Edward E. Wall, W. W. Horner, F. G. Jonah, R. J. Lockwood..... 267
Discussion: 420, 421, 422, 425, 549, 550, 551, 654, 655, 656, 657, 660, 746, 747, 865, 867, 869, 951
"Western Pennsylvania's Engineering Progress." Morris Knowles..... 377
Discussion: E. K. Morse, 749; Louis P. Blum, 866

CITY PLANNING

"Detroit Builds Highways for the Future." Leroy C. Smith..... 939
"Highway Grade Separations." H. A. Shuptrine..... 1195
"Making the Most of the City Plat." Rolland S. Wallis..... 127
"Manhattan's Mid-Town Vehicular Tunnel." John R. Slattery..... 1172
Meeting of International Exposition for Housing and Town Planning..... 568
"More Proof that City Planning Pays." U. S. Grant, 3d..... 507
"Problems of a Large City." A Symposium. W. F. Gephart, E. R. Kinsey, A. P. Greensfelder, Edward E. Wall, W. W. Horner, F. G. Jonah, R. J. Lockwood..... 267
Discussion: Henry M. Waite, 420; G. H. Herrold, 421, 657; L. C. Datz, 422; N. T. Veatch, Jr., 425, 550;

CITY PLANNING (*Continued*)

Harold M. Lewis, 549, 865; Harrison P. Eddy, 551; Wynkoop Kiersted, 654; John N. Chester, 655; Alfred Lewald, C. G. Wigley, 656; C. O. Sherrill, 657; W. H. Courtenay, 660; Morris Knowles, 746; Hunter McDonald, 747; Donald M. Baker, 865; Samuel A. Greeley, 867; Julius E. Willoughby, E. A. Hadley, 869; W. W. Crosby, 951

"St. Paul Plans for the Future." A Symposium. George H. Herrold, William N. Carey, J. A. Childs..... 1327

"Some City Planning Problems of Tacoma." C. E. Putnam..... 1104
Discussion: W. A. Kunigk, 1401

"The Civil Engineer's Part in the City Plan." Morris Knowles..... 524
Discussion: Gustav Lindenthal, Urie N. Arthur, 744; A. J. Hawkins, Frederick Bigger, 745; E. P. Goodrich, 866; R. H. Randall, 954; George H. Herrold, Joseph T. Woodruff, 1036

CIVIL ENGINEERING

"A Century of Progress in Civil Engineering." Anson Marston and Mark B. Morris..... 929

A Latin-American engineering and construction enterprise. J. A. L. Waddell..... 1283
Discussion: George Schobinger, Wilson T. Ballard, 1402; H. de B. Parsons, F. Lavis, 1403

American engineers honored by Greece. 1045

Bargain prices in the construction field.. 1217

Civil engineering field not overcrowded. 1210, 1285

"Educating the Civil Engineer." H. P. Hammond..... 1269

French highway engineers entertained. 220

Honorary degrees for engineers..... 963

Obligation of engineers to former employers..... 48

"Registration of Civil Engineers in California." Donald M. Baker..... 1201

"Research Advances Civil Engineering." Alfred D. Flinn..... 14
Discussion: 209, 335, 431, 544, 545, 650

Shall civil engineers lose the right to design buildings? Morris Kampf..... 945
Discussion: Carl E. Paulsen, 1286

Supply of civil engineers in excess of demand. Frank B. Campbell..... 1135

"The Civil Engineer's Part in the City Plan." Morris Knowles..... 524
Discussion: 744, 745, 866, 954, 1036

The "New Competition and New Horizons in Engineering." F. H. McDonald..... 1361

See also Engineers and Engineering

CIVIL ENGINEERS

See Civil Engineering

CLAY

"Using Burned Clay Masonry." F. E. Emery..... 1189

COAL HANDLING MACHINERY

"Electrical Operation of Car Dumper." C. S. Albright and R. E. Rice..... 103

"Heavy Duty Wire Ropes and Sheaves." B. R. Leffler..... 107
Discussion: 110, 111, 209, 547

"Loading Six Million Tons of Coal." J. A. Stocker..... 99, 207

"Structural Design and Details." (Car dumper at Toledo, Ohio.) Wendell P. Brown..... 105
Discussion: 206

COFFERDAMS

Cofferdam in Boulder Canyon..... 5, 204

"Marine Oil Well Construction." T. Farrance Davey..... 721

COLUMNS

Design of welded buildings. Leonard C. Jordan..... 864
Discussion: Anthony S. Coombs, 1034; H. L. Doolittle, 1136

"New Formula for Concrete Columns Needed." Herbert J. Gilkey and Warren Raeder..... 924
Discussion: David Molitor, 1133; W. A. Slater, 1284; Samuel T. Carpenter, 1290

"New York's Tallest Skyscraper." H. G. Balcom..... 467
Discussion: 743, 1289

Partially supported..... 1137

COMMERCE

"Chesapeake Bay Port Developments." A Symposium. Joseph D. Arthur, Jr., Warren T. Hannum, J. Gordon Bohannan..... 801

Commercial transportation..... 827

"The Atlantic Intracoastal Waterway." G. R. Young..... 795
Discussion: 1129

CONCRETE

"A Deck Slab for Long-Span Bridges." Jack Davidon..... 1026

"Basic Principles of Concrete Making." F. R. McMillan..... 601
Discussion: H. F. Faulkner, 944; C. A. Hughes, 1029; V. L. Glover, 1030; G. M. Williams, 1031; I. E. Burks, 1132

"Checking Arch Dam Designs with Models." J. L. Savage and Ivan E. Houk..... 695
Discussion: 954

"Honeycomb Gravity-Type Concrete Dams." C. E. Grunsky..... 630
Discussion: 871, 949, 1134, 1135, 1209

"Logic in Engineering Diagnosis." Thaddeus Merriman..... 625
Discussion: 873, 946

"New Formula for Concrete Columns Needed." Herbert J. Gilkey and Warren Raeder..... 924
Discussion: 1133, 1284, 1290

"Protecting Reinforced Concrete Against Deterioration by Sea Water." G. F. Nicholson..... 1243

"Recent Advances in Buttress-Type Dams." Calvin V. Davis..... 387

"Researches in Concrete Aid the Engineer." H. F. Gonnerman..... 727

Use of high stress concrete in viaduct construction..... 1401

Work of Joint Committee on Concrete and Reinforced Concrete..... 753, 1040

See also Reinforced Concrete

CONSULTING ENGINEERS

See Engineers and Engineering

CONTRACTORS

"A Summary of the Present State of Prequalification." C. J. Tilden..... 504

"Prequalification Eliminates Unfit Contractors." A Symposium. Robert B. Brooks, Allan Jay Parrish, Ward P. Christie, W. W. Zass..... 293
Discussion: 946, 947, 1288

CONTRACTS

"A Summary of the Present State of Prequalification." C. J. Tilden..... 504

"Arbitration in Public Works Contracts." A Symposium. Charles H. Stevens, P. A. Beatty..... 847
Discussion: E. G. Bradbury, Augustus Smith, 1035

"Bidding Security Desired for Construction Work." Scott Keith..... 541

"Prequalification Eliminates Unfit Contractors." A Symposium. Robert B. Brooks, Allan Jay Parrish, Ward P. Christie, W. W. Zass..... 293
Discussion: W. W. Crosby, 946; N. T. Veatch, Jr., 947; Harry J. Kirk, 1288

CONVICT LABOR

See Labor

COSTS

Bargain prices in the construction field.. 1217

"Cheap Power from Natural Gas." John H. Chase..... 917

Comparisons of costs of universally used commodities..... 1027

"Convict Labor in Highway Construction." Henry G. Shirley..... 812
Discussion: 1137

Cost of engineering education in the United States..... 1273

Cost of operating Milwaukee activated sludge plant..... 35

"Output Factors for Excavation and Material-Handling Equipment." A. E. Holcomb..... 26
Discussion: 209, 423

Summary of cost estimates Colorado River aqueduct..... 376

Tonnage and costs for open pit and underground mines..... 1346

DAMS

"A Modern Mexican Irrigation Development." Augustin M. Valdes..... 1009

"Ample Security for Hoover Dam." A Symposium. Elwood Mead, H. M. Westergaard..... 1001

"Blasting a Precast Dam Into Place." C. P. Dunn..... 159, 334
Discussion: L. F. Harza, 335

Boulder Dam renamed..... 54

"Brook's Hollow Earth-Fill Dam." Eldred D. Smith..... 405

"Checking Arch Dam Designs with Models." J. L. Savage and Ivan E. Houk..... 695
Discussion: Edward Godfrey, 954

Chute à Caron Dam in motion pictures. 568

Diagram for reservoir capacity corrected. John W. Pritchett..... 208

"Four Modern Hydro-Electric Power Developments." A Symposium. Verne Gongwer, T. H. Carver, William D. Shannon, Lyman Griswold..... 1106

"Honeycomb Gravity-Type Concrete Dams." C. E. Grunsky..... 630
Discussion: B. F. Jakobsen, 871; W. J. E. Binnie, Emil Probst, 949; Lewis R. East, 1134; Lars Jorgensen, 1135; N. Kelen, 1209

"Hoover Dam." Elwood Mead..... 3
Discussion: A. J. Wiley, Edward Wegmann, 204; C. E. Grunsky, 333; Louis C. Hill, 334; Lars Jorgensen, 421

Humanitarian movement in building Hoover Dam..... 963

Plans for deepening existing channel (Mississippi River)..... 1352

"Preventing Erosion Below Overflow Dams." Robert F. Ewald..... 527
Discussion: F. W. Hanna, 867; Orrin L. Brodie, 874; Paul Bauman, 949; Charles H. Paul, 950

"Recent Advances in Buttress-Type Dams." Calvin V. Davis..... 387

"Safety Limitations of the Hoover Dam." M. H. Gerry, Jr..... 921
Discussion: Louis C. Hill, C. H. Howell, 1206; Charles H. Paul, Lars Jorgensen, 1287; Jacob Feld, 1288; William Huntley Hampton, 1398; F. L. Ransome, 1397

"The Osage Hydro-Electric Project." G. R. Strandberg..... 243

See also Spillways

DEGREES, HONORARY

Honorary degrees for engineers..... 963

DOCKS

"Loading Six Million Tons of Coal." J. A. Stocker..... 99, 207

DOORS

History of human endeavor portrayed in bronze..... 1216

DRAINAGE

Natural water courses as municipal assets..... 277, 550, 656, 657, 867

DROUGHTS

"National Aspects of the Drought." John C. Hoyt..... 1167

EARTHQUAKES

Japanese seismographer to lecture in the United States..... 222, 1300

ECOLE POLYTECHNIQUE FEDERALE

Celebrates anniversary..... 439

ECONOMICS

"Engineers' Opportunities." Francis Lee Stuart..... 1337

"Factors in Successful Highway Operation." A Symposium. William J. Fox, E. E. East, L. I. Hewes, W. W. Crosby, Jacob L. Crane, Jr., Jay Downer, W. W. Horner, Daniel L. Turner..... 1118
Discussion: 1398, 1399

"Financing Street and Highway Improvements." R. W. Crum..... 532

ECONOMICS (*Continued*)

Highway expenditures must be economically justifiable. Francis W. Collins ... 1399
"Highway Traffic Control." Maxwell Halsey ... 733
Discussion: 1032
"Inaugural Address." Francis Lee Stuart ... 557
Minnesota iron mining industry ... 1349
"Side Lights on Highway Economics." R. L. Morrison ... 1005
"The Columbia River—for Irrigation and Power." A Symposium. John S. Butler, Ross K. Tiffany ... 1075
Discussion: 1207, 1285, 1286, 1396, 1404
"The Way to National Progress and Prosperity." C. E. Grunsky ... 1182

EDUCATION

"Educating the Civil Engineer." H. P. Hammond ... 1269
Engineering Foundation, Inc., and engineering education ... 223
"Logic in Engineering Diagnosis." Thaddeus Merriman ... 625
Discussion: W. F. Way, G. M. Williams, 873; B. F. Jakobsen, 946

ELASTICITY

"Quest of Elasticity." H. F. Moore ... 171
Discussion: John M. Lessells, 651; F. B. Seely, 652

ELECTRIC CODES

National Electrical Code approved ... 1301

ELECTRIC RAILWAYS

"Cleveland Railroads Dedicate Union Terminal." H. D. Jouett ... 77
Discussion: 546
"Foundations for the Cleveland Union Terminal." C. P. Marsh ... 83
"Solving Manhattan's Transportation Problem." Francis Lee Stuart ... 9
Discussion: 44, 329
See also Interurban Railways: Street Railways

EMPLOYMENT

Bargains in engineering ability. E. W. Ritchie ... 650
Bids for engineering service ... 1300
Civil engineering field not overcrowded ... 1210, 1285
Engineers aid ... 211, 338, 752, 1040, 1408
Federal Employment Stabilization Board Director named ... 1039
Forward-looking program ... 1297
Men available ... 1297
"Report of Committee on Engineering Employment in Russia." Philip W. Henry, R. W. Hebard, George W. Kittredge, George H. Pegram, John R. Slattery ... 755
Supply of civil engineers in excess of demand. Frank B. Campbell ... 1135
Discussion: Francis P. Witmer, 1210; Robert C. Ratcliffe, 1285
Technical vs. administrative duties of engineers ... 221
The engineer and Russia. G. M. Purver 547

ENGINEERING ANECDOTES

A close call ... 1218
Rope friction saves a bridge. E. K. Morse ... 1416

ENGINEERING COUNCILS

An integral unit of Chamber of Commerce ... 53
Discussion: Maurice R. Scharff, 134

ENGINEERING EDUCATION

See Education

ENGINEERING ENGLISH

What is a project? Charles W. Sherman 546

ENGINEERING FEES AND SALARIES

Fees of consulting engineers ... 210
"Large Turnover in City Managerships." Arthur Richards ... 641
Let the engineer help himself. Allen B. McDaniel ... 207
Studies on compensation ... 47, 210, 338, 565
The engineer's salary and budget. Ernest P. Goodrich ... 1211

ENGINEERING FOUNDATION

Gift to ... 1044
Meeting to discuss engineering education 223

ENGINEERING HISTORY

"A Century of Progress in Civil Engineering." Anson Marston and Mark B. Morris ... 929
"Byzantine Aqueduct Still in Use." Waldo E. Smith ... 1249
"Controlling Floods in China." E. W. Lane ... 165
Discussion: 328, 420
"Developing the Pacific Northwest." Ralph Budd ... 1071
"Development of Railroad Passenger Terminals." Alonzo J. Hammond 1176
"Great Min River Irrigation Project" E. W. Lane ... 397
Discussion: 863, 951
"Ingenuity of the Ancient Chinese." E. W. Lane ... 17
Discussion: H. E. Babbitt, 134; Ralph W. Powell, 327; Harold E. Wessman, 328; Paul P. Wiant, 420; Arthur M. Shaw, 649
Leonardo da Vinci ... 1218
"Railroading in the Northwest." W. L. Darling ... 1340
The story of Homestake Pass ... 1301
"Tracing the Engineer in Early Egypt and Assyria." J. H. Gandolfo ... 632
Discussion: Hugh Muckleston, 1032
"Western Pennsylvania's Engineering Progress." Morris Knowles ... 377
Discussion: 749, 866

ENGINEERING INDEX SERVICE

A great research service ... 650

ENGINEERING SOCIETIES EMPLOYMENT SERVICE

Expansion of ... 49

ENGINEERING SOCIETIES LIBRARY

A great research service ... 650
Our library ... 1041

ENGINEERING SOCIETIES MONOGRAPHS

Publication of first monograph ... 1142

ENGINEERS AND ENGINEERING

A Latin-American engineering and construction enterprise. J. A. L. Waddell ... 1283
Discussion: 1402, 1403
Another engineer in statuary hall ... 142
Art by engineers ... 343
Certification of engineers by our major engineering societies ... 23
Consultants for U.S. Corps of Engineers ... 54
Does the Engineer respond to advertising? Morris Knowles ... 944
Engineers meet with members of state legislature ... 439
"Engineers' Opportunities." Francis Lee Stuart ... 1337
"Inaugural Address." Francis Lee Stuart ... 557
"Large Turnover in City Managerships." Arthur Richards ... 641
Let the engineer help himself. Allen B. McDaniel ... 207
"Logic in Engineering Diagnosis." Thaddeus Merriman ... 625
Discussion: 873, 946
News of engineers ... 56, 144, 224, 346, 440, 569, 668, 762, 884, 965, 1045, 1144, 1219, 1303, 1417
"Our Professional Background." Discussion: John R. Freeman, 133
Outstanding engineers ... 346
"Professional Status of the Engineer." W. E. Wickenden ... 23
Discussion: Comfort A. Adams, 431; Alonzo J. Hammond, 874
Rensselaer names buildings for graduates 1415
The engineer and Russia ... 547
"The New Competition and New Horizons in Engineering." F. H. McDonald 1361
Warning to engineers ... 668, 876
Women's interest in engineering is countrywide ... 1303
See also Civil Engineering; Employment; Engineering Fees and Salaries; Engineering History; Registration of Engineers

ENGLISH LANGUAGE

What is a project? Charles W. Sherman ... 546

EROSION

"Preventing Erosion Below Overflow Dams." Robert F. Ewald ... 527
Discussion 867, 874, 949, 950
"Reconstruction of a Large Spillway." Robert F. Ewald ... 709
"Sand Movement and Beach Erosion." E. J. Dent ... 821

EXCAVATION

"Brook's Hollow Earth-Fill Dam." Eldred D. Smith ... 405
"Constructing the Detroit-Windsor Tunnel." S. A. Thoresen ... 613
"Constructing World's Longest Subway Station." Howard F. Peckworth ... 607
Discussion: 865, 1031
"Output Factors for Excavation and Material-Handling Equipment." A. E. Holcomb ... 26
Discussion: J. Lee Plummer, 209; T. Warren Allen, 423

EXCAVATORS

"Output Factors for Excavation and Material-Handling Equipment." A. E. Holcomb ... 26
Discussion: 209, 423

FACTORIES

"Modern Factory Built in Northern Korea." Wells N. Thompson ... 1275

FALSEWORK

"Constructing World's Longest Subway Station." Howard F. Peckworth ... 607
Discussion: 865, 1031

FEES OF ENGINEERS

See Engineering Fees and Salaries

FILTERING MATERIALS

"An Accelerated Soundness Test." Herbert F. Kriege ... 120
Discussion: Roy S. Lanphear, F. V. Reagel, 424; A. T. Goldbeck, 425; W. Scott Johnson, 545; G. W. Ward, 553
"Choosing Filtering Materials." Report of Committee of Sanitary Engineering Division on Filtering Materials. William E. Stanley, James W. Armstrong, W. H. Dittoe, George B. Gascoigne, N. T. Veatch, Jr. ... 1388
"Filtering Materials for Trickling Filters." William E. Stanley ... 113
Discussion: Roy S. Lanphear, 424; W. Scott Johnson, 545
"Selecting the Material to Prevent Clogging." (Trickling filters.) Frank Woodbury Jones ... 118
Discussion: E. Sherman Chase, 330; Roy S. Lanphear, 331, 424; W. Scott Johnson, 545

FILTRATION

"Operating Filters to Remove Organic Growths." Charles C. Hommon ... 116
Discussion: Roy S. Lanphear, 424; W. Scott Johnson, 545
"Selecting the Material to Prevent Clogging." (Trickling filters.) Frank Woodbury Jones ... 118
Discussion: 330, 331, 424, 545
"Trickling Filter Loadings." J. A. Childs; George J. Schroepfer ... 1391
See also Water Purification

FINANCE

"The Way to National Progress and Prosperity." C. E. Grunsky ... 1182
To stabilize Latin-American finances ... 1402

FIRE PROTECTION

"Safeguarding Industry Against Fire." H. E. Magnuson ... 392
Discussion: S. R. Bellows, 862

FIRE-PROOFING

"Using Burned Clay Masonry." F. E. Emery ... 1189

FLOODS

"Better Control of the Lower Mississippi." J. P. Kemper ... 1021
Discussion: 1208; 1404.

FLOODS (*Continued*)
"Controlling Floods in China." E. W. Lane ... 165
Discussion: Harold E. Weesman, 328; Paul P. Wiant, 420
Development of Mississippi River flood control ... 343
"Flood Control and Channel Maintenance on the Lower Mississippi River." Lytle Brown ... 815
Discussion: 1028
Flood control in Hungary ... 1044
"Flood Control Studies in the Mississippi Valley." A Symposium. L. D. Worsham, George R. Clemens ... 258
Discussion: T. P. Pendleton 658
"Improving the Brazos River." Milo P. Fox ... 287
Discussion: 426, 740, 741
"Mississippi River—A National Flood Problem." J. F. Coleman ... 401
Discussion: Gardner S. Williams, 650; W. E. Elam, 652; Baxter L. Brown, 660; Charles H. West, 741; Gerard H. Matthes, 742
Regulations of the lower Mississippi. Hubert Engels ... 1396

FLOORS
"An Unusual Framing Method." H. S. Woodward ... 542

FLUMES
"Treated Lumber for Irrigation Structures." L. Murray Grant ... 1090

FORTIFICATIONS
Sutter's Fort at Sacramento restored ... 54

FOUNDATIONS
"A Successful Underpinning Experience." Henry Wise ... 42
"A Unique Bridge Over a Unique River." C. D. Purdon ... 382
Discussion: 661, 862, 863, 954
"Bank of Manhattan Company Building." Henry V. Spurr ... 472
Discussion: 743, 871, 1289.
"Engineering Problems in the Tropics." Carl B. Andrews ... 1184
"Foundation Problems and Their Solution." A Symposium. L. R. Viterbo, A. C. Everham, W. J. Newman, S. W. Bowen, O. E. Mogensen ... 301
Discussion: Constant R. Marks, 654; Warren Raeder, 749; H. Austill, Alonzo J. Hammond, 868; Walter F. Schulz, 947
"Foundations for the Cleveland Union Terminal." C. P. Marsh ... 83
"Marine Oil Well Construction." T. Farrance Davey ... 721
Report of Committee on Earths and Foundations ... 958
See also Underpinning

FREIGHT
"Terminals on Inland Waterways." Walter F. Schulz ... 253
"The Atlantic Intracoastal Waterway." G. R. Young ... 795
Discussion: 1129
"Transportation Facilities of a Modern Railroad." Elisha Lee ... 791

GAGES
Improving the accuracy of instruments. 1098
The Bureau of Standards ... 491, 660

GAS, NATURAL
"Cheap Power from Natural Gas." John H. Chase ... 917
"Natural Gas for Steam Power." G. I. Rhodes ... 513
Discussion: Haylett O'Neill, 1130

GEODESY
"The Utility of Geodetic Control Surveys." R. S. Patton ... 836
Discussion: 1033, 1034, 1132
U.S. Coast and Geodetic Survey ... 498

GEOLOGY
The earth's interior ... 344

GIRDERS
"Simplifying Structural Steel Design." Vsevolod Khmelevsky ... 1128
See also Beams: Bridges

GRADES
"Highway Grade Separations." H. A. Shuptrine ... 1195

GRAPHICS
"Designing Riveted Connections with Charts and Tables." Odd Albert ... 413
"Rapid Calculation for Reservoir Discharge." R. D. Goodrich ... 417
"Short Cuts in Designing Reinforced Concrete Beams." Odd Albert ... 646

HANDLING OF MATERIALS
"Improvements in Handling Building Material." George G. Wheat ... 484
"Output Factors for Excavation and Material-Handling Equipment." A. E. Holcomb ... 26
Discussion: 209, 423
See also Coal Handling Machinery

HANGARS
"Erecting the World's Largest Roof." Wilbur J. Watson ... 71

HARBORS
"Chesapeake Bay Port Developments." A Symposium. Joseph D. Arthur, Jr., Warren T. Hannum, J. Gordon Bohannan ... 801
See also Oil Pollution of Rivers and Harbors: Waterways

HIGHWAY POLICE
Training a highway patrol ... 1382

HIGHWAYS
"Asphaltic Emulsions for Economical Highways." C. L. McKesson ... 1255
"Convict Labor in Highway Construction." Henry G. Shirley ... 812
Discussion: Harry J. Kirk, 1137
"Design of Pavement Signs for Traffic Control." C. J. Tilden ... 1281
"Designing State Highway Systems." T. H. Cutler ... 315
Discussion: W. V. Buck, 548; W. W. Crosby, 872
"Detroit Builds Highways for the Future." Leroy C. Smith ... 939
"Factors in Selecting County Highways." Roy W. Jablonsky ... 319
"Factors in Successful Highway Operation." A Symposium. William J. Fox, E. E. East, L. I. Hewes, W. W. Crosby, Jacob L. Crane, Jr., Jay Downer, W. W. Horner, Daniel L. Turner ... 1118
Discussion: Philip H. Ward, 1398; H. E. Phelps, 1399
"Financing Street and Highway Improvements." R. W. Crum ... 532
Highway expenditures must be economically justifiable. Francis W. Collins ... 1399
"Highway Grade Separations." H. A. Shuptrine ... 1195
"Highway Practice in Minnesota." A Symposium. O. L. Kipp, C. M. Babcock, Earle Brown ... 1378
"Highway Traffic Control." Maxwell Halsey ... 733
Discussion: B. F. Jakobsen, 1032
"Highway Transport Problems." Maxwell Halsey ... 184
Discussion: Gilbert Robinson, 548; Theodore M. Matson, 652; R. L. Morrison, Miller McClintock, 653
Meeting of Sixth International Road Congress ... 55
"Progress Report of Committee on Street Thoroughfares Manual of the City Planning Division." W. W. Crosby, Jacob L. Crane, Jr., Jay Downer, W. W. Horner, Daniel L. Turner ... 1125
Discussion: Philip H. Ward, 1398
"Road Building on Dredger Fill." S. F. Ferguson ... 638
"Side Lights on Highway Economics." R. L. Morrison ... 1005
The Bureau of Public Roads ... 494
See also Pavement

HOUSING
Meeting of International Exposition for Housing and Town Planning ... 568

HYDRAULIC JUMP
"A Simplified Hydraulic Jump Formula." Karl R. Kennison ... 543
"Preventing Erosion Below Overflow Dams." Robert F. Ewald ... 527
Discussion: 867, 874, 949, 950
Unusual flow phenomena ... 1101

HYDRAULIC LABORATORIES
"Great German Hydraulic Laboratory." Hunter Rouse ... 715
National hydraulic laboratory assured 55
"The National Hydraulic Laboratory at the Bureau of Standards." George K. Burgess ... 911

HYDRO-ELECTRIC POWER PLANTS
See Power Plants

HYDROGRAPHY
U.S. Coast and Geodetic Survey ... 498

HYDROLOGY
"National Aspects of the Drought." John C. Hoyt ... 1167
The Geological Survey ... 489

ILLINOIS SOCIETY OF ENGINEERS
Officers elected ... 569

INDUSTRY
History of human endeavor portrayed in bronze ... 1216

INSTRUMENTS
See Gages: Levels: Measuring Instruments: Slide Rules: Surveying Instruments: Water Meters

INTERNATIONAL EXPOSITION FOR HOUSING AND TOWN PLANNING
Meeting ... 568

INTERNATIONAL ROAD CONGRESS
French highway engineers entertained .. 220
Meeting of Sixth ... 55

INTERNATIONAL STANDARDS ASSOCIATION
Conference ... 222

INTERURBAN RAILWAYS
"Shaker Heights Develops Interurban Railroad." William E. Pease ... 88

IRON
Purpose of Alloys of Iron Research ... 963
See also Cast Iron

IRON ORES
"Open-Pit Iron Mining in the Mesabi Range." A Symposium. Russell H. Bennett, E. W. Davis ... 1345

IRRIGATION
"A Modern Mexican Irrigation Development." Augustin M. Valdes ... 1009
Division of Agricultural Engineering ... 501
"Great Min River Irrigation Project." E. W. Lane ... 397
Discussion: Arthur M. Shaw, 863; Max Wegenstein, 951
"Hoover Dam." Elwood Mead ... 3
Discussion: 204, 333, 334
"Problems of Water Measurement." A Symposium. J. C. Stevens, L. Standish Hall, Fred C. Scobey ... 1095
Discussion: 1283, 1289
"The Columbia River—for Irrigation and Power." A Symposium. John S. Butler, Ross K. Tiffany ... 1075
Discussion: 1207, 1285, 1286, 1396, 1404
"Treated Lumber for Irrigation Structures." L. Murray Grant ... 1090

IRRIGATION CANALS
"Sand Trap for Canals Works on Vortex Principle." R. L. Parshall ... 419

LABOR
"Convict Labor in Highway Construction." Henry G. Shirley ... 812
Discussion: 1137

LAW
See Water Laws

LEVEES
"Flood Control and Channel Maintenance on the Lower Mississippi River." Lytle Brown ... 815
Discussion: 1028
"Mississippi River—A National Flood Problem." J. F. Coleman ... 401
Discussion: 650, 652, 660, 741, 742

LEVELS

"Universal Leveling Rod Reduces Calculations." Fred Morley..... 645
Discussion: L. C. Higbee, 953

LIBRARIES

"Research Advances Civil Engineering." Alfred D. Flinn..... 14
Discussion: 209, 335, 431, 544, 545, 650
See also Engineering Societies Library

LUMBER

See Timber

MAPS

"Aerial Photography for Railroad Location." Millard A. Butler..... 841
"Aerial Survey for Transmission-Line Location." F. G. Lana..... 249
Discussion: 554
"Developing the Upper Mississippi." A Symposium. Hibbert M. Hill, Lenvik Ylvisaker..... 1352
"Flood Control Studies in the Mississippi Valley." A Symposium. L. D. Worsham, George R. Clemens..... 258
Discussion: 658
"Modernizing Triangulation Practice." William Bowie..... 189
Discussion: 428, 429, 430, 554, 555, 658, 659, 661
"Photographic Surveys of Hoover Dam Site." C. H. Birdseye..... 619
Discussion: 872, 1130
The Geological Survey..... 489

MASONRY

"Improvements in Handling Building Material." George G. Wheat..... 484
"Using Burned Clay Masonry." F. E. Emery..... 1189

MATERIALS OF CONSTRUCTION

"An Accelerated Soundness Test." Herbert F. Kriege..... 120
Discussion: 424, 425, 545, 553
"Engineering Problems in the Tropics." Carl B. Andrews..... 1184
"Improvements in Handling Building Material." George G. Wheat..... 484
"Quest of Elasticity." H. F. Moore.... 171
Discussion: 651, 652
The Bureau of Standards.....491, 660
See also Cast Iron: Cement: Concrete: Iron: Reinforced Concrete: Steel: Timber

MEASURING INSTRUMENTS

"A Highly Sensitive Device for Measuring Stresses and Deflections." John Hedberg..... 540
See also Gages: Water Meters

MEMORIALS

To Merrit H. Smith..... 53
To Allen Hazen..... 55
To John C. Greenway..... 142

METEOROLOGY

Commercial transportation..... 827
"Engineering Problems in the Tropics." Carl B. Andrews..... 1184
"Twelve-Month Construction." James S. Taylor..... 322
Discussion: 551, 748, 749, 874, 946

METERS

See Water Meters

MINING

"Open-Pit Iron Mining in the Mesabi Range." A Symposium. Russell H. Bennett, E. W. Davis..... 1345

MODELS

"Checking Arch Dam Designs with Models." J. L. Savage and Ivan E. Houk..... 695
Discussion: 954
Division of Agricultural Engineering... 501
"Great German Hydraulic Laboratory." Hunter Rouse..... 715
"New Method of Mechanical Analysis for Trusses." Anders H. Bull.....181, 746
Discussion: 427
"Problems of Water Measurement." A Symposium. J. C. Stevens, L. Standish Hall, Fred C. Scobey..... 1095
Discussion: 1283, 1289
"Reconstruction of a Large Spillway." Robert F. Ewald..... 709
"Simple Model Checks Indeterminate Structure." J. Charles Rathbun.... 131

MONOGRAPHS

Publication of Engineering Societies monographs.....762, 1142

MOVING PICTURES

Movies of Chute à Caron Dam..... 568

NATIONAL ELECTRICAL CODE

Approved..... 1301

NATIONAL SAFETY COUNCIL

Congress and exposition..... 1216

NATURAL GAS

See Gas, Natural

NAVIGATION

"Bridges over Navigable Waters." Report of Bridge Legislation Committee American Engineering Council. H. S. Crocker, V. H. Cochrane, A. H. Fuller, A. P. Greensfelder, F. M. Gunby, J. L. Harrington, D. B. Steinman..... 175

OIL POLLUTION OF RIVERS AND HARBORS

Pollution of public beaches..... 1142

OIL WELLS

See Wells

PARKS AND PARKWAYS

Dividends from municipal parks..... 549
"Executing Chicago's Regional Plan." Robert Kingery..... 1366
"Metropolitan Park Improvements Pay." William A. Stinchcomb..... 123
Discussion: Jay Downer, 422; Harold M. Lewis, 549

PATENTS

Single court of patent appeals proposed. 964

PAVEMENT

"Asphaltic Emulsions for Economical Highways." C. L. McKesson..... 1255
New pavement has steel base..... 53
"Road Building on Dredger Fill." S. F. Ferguson..... 638

PAVEMENT SIGNS

See Traffic Signs and Signals

PHOTOGRAPHY

"Photographic Surveys of Hoover Dam Site." C. H. Birdseye..... 619
Discussion: 872, 1130

PHOTOGRAPHY, AERIAL

"Aerial Photography for Railroad Location." Millard A. Butler..... 841
See also Surveying, Aerial

PIERS

"An Unusual Sea Wall Achievement." C. M. Cram..... 409
See also Bridge Piers: Foundations

PILES

A caisson foundation job..... 311
"Protecting Reinforced Concrete Against Deterioration by Sea Water." G. F. Nicholson..... 1243
When to use piling.....304, 868

PIPE

Water pipe cast in 1817..... 883

PIPE LINES

Work of Underground Pipe Protection Institute..... 343

POLLUTION OF STREAMS

See Stream Contamination

PORTS

See Harbors

POWER PLANTS

"Cheap Power from Natural Gas." John H. Chase..... 917
"Four Modern Hydro-Electric Power Developments." A Symposium. Verne Gongwer, T. H. Carver, William D. Shannon, Lyman Griswold..... 1106
"Hoover Dam." Elwood Mead..... 3
Discussion: 204, 333, 334
"Natural Gas for Steam Power." G. I. Rhodes..... 513
Discussion: 1130
"Record Hydro-Electric Turbine Installed." John P. Hogan..... 519
Discussion: 740, 947, 948, 1136
"The Osage Hydro-Electric Project." G. R. Strandberg..... 243

POWER TRANSMISSION

"Aerial Survey for Transmission-Line Location." F. G. Dana..... 249
Discussion: 554

PUBLIC SPEAKING

Ten rules..... 338

PUMPS

"Cheap Power from Natural Gas." John H. Chase..... 917

RADIO COMMUNICATION

Commercial transportation..... 827
Work of American Radio Relay League. 664
Discussion: J. H. Granbery, 748

RADIUM

Radium shows defects in steel..... 1303

RAILROAD STATIONS

"Constructing World's Longest Subway Station." Howard F. Peckworth, 607
Discussion: J. C. Meem, 864; John L. Washbourne, 1031

RAILROAD TERMINALS

"Cleveland Railroads Dedicate Union Terminal." H. D. Jouett..... 77
Discussion: Carl E. Paulsen, 546
Coordination of terminals.....
280, 420, 660, 747, 869
"Development of Railroad Passenger Terminals." Alonzo J. Hammond... 1176
"Foundations for the Cleveland Union Terminal." C. P. Marsh..... 83

RAILROADS

"Aerial Photography for Railroad Location." Millard A. Butler..... 841
"Development of Railroad Passenger Terminals." Alonzo J. Hammond... 1176
First steam railroad in the United States to be scrapped..... 964
"Longest Continuous Railroad Trusses Yet Constructed." Wilson T. Ballard. 536
"Railroading in the Northwest." W. L. Darling..... 1340
The story of Homestake Pass..... 1301
"Transportation Facilities of a Modern Railroad." Elisha Lee..... 791
See also Electric Railways: Freight: Railroad Stations: Railroad Terminals: Rails: Track

RAILS

New rail sections for Pennsylvania Railroad..... 758
"Transportation Facilities of a Modern Railroad." Elisha Lee..... 791
See also Track

RAIN GAGES

See Gages

RAINFALL

"Colorado River Aqueduct." F. E. Weymouth..... 371
"National Aspects of the Drought." John C. Hoyt..... 1167

RAPID TRANSIT

Municipal partnership in mass transportation.....282, 422
"Shaker Heights Develops Interurban Railroad." William E. Pease..... 88
See also Electric Railways: Street Railways: Subways

REGIONAL PLANNING

"Executing Chicago's Regional Plan." Robert Kingery..... 1366
"Factors in Selecting County Highways." Roy W. Jablonsky..... 319
"More Proof that City Planning Pays." U. S. Grant, 3d..... 507
"Problems of a Large City." A Symposium. W. F. Gephart, E. R. Kinsey, A. P. Greensfelder, Edward E. Wall, W. W. Horner, F. G. Jonah, R. J. Lockwood..... 267
Discussion: 420, 421, 422, 425, 549,

REGIONAL PLANNING (*Continued*)

550, 551, 654, 655, 656, 657, 660, 746, 747, 865, 867, 869, 951
"Western Pennsylvania's Engineering Progress." Morris Knowles..... 377
Discussion: 749, 866

REGISTRATION OF ENGINEERS

Registration and solidarity..... 1039
Registration Board appointments..... 751
"Registration of Civil Engineers in California." Donald M. Baker..... 1201
Registration progress.....221, 878
Wisconsin Board of Examiners of Architects and Engineers..... 1415

REINFORCED CONCRETE

"Graphical Spacing of Stirrups in Concrete Beams." Odd Albert..... 1395
"New Formula for Concrete Columns Needed." Herbert J. Gilkey and Warren Raeder..... 924
Discussion: 1133, 1284, 1290
"Protecting Reinforced Concrete Against Deterioration by Sea Water." G. F. Nicholson..... 1243
"Researches in Concrete Aid the Engineer." H. F. Gonnerman..... 727
"Short Cuts in Designing Reinforced Concrete Beams." Odd Albert..... 646
Work of Joint Committee on Concrete and Reinforced Concrete.....753, 1040

RESEARCH

Assistance in Chinese research work.... 956
"Basic Principles of Concrete Making." F. R. McMillan..... 601
Discussion: 944, 1029, 1030, 1031, 1132
Edwin H. McHenry wills funds for research..... 1215
"Federal Bureaus Aid the Profession." A Symposium. Julian D. Sears, George K. Burgess, Thomas H. MacDonald, Lytle Brown, R. S. Patton, S. H. McCrory.....489, 660
"Guiding Principles of the Activated Sludge Proccess." T. Chalkley Hatton..... 31
Discussion: 45, 552
Purpose of Alloys of Iron Research..... 963
"Research Advances Civil Engineering." Alfred D. Flinn..... 14
Discussion: William E. Wickenden, 209; Walter E. Spear, 335; Arthur D. Little, Philip W. Henry, 431; Ely C. Hutchinson, William A. DelMar, D. Robert Yarnell, Allen S. Miller, 544; Edwin H. Colpitts, L. V. Redman, 545; J. E. Hannum, 650
"Researches in Concrete Aid the Engineer." H. F. Gonnerman..... 727

RESERVOIRS

Diagram for reservoir capacity corrected. John W. Pritchett..... 208
Plans for deepening existing channel (Mississippi River)..... 1352
"Rapid Calculation for Reservoir Discharge." R. D. Goodrich..... 417
See also Dams

RETAINING WALLS

The Hangchow sea wall..... 649

RIVER TERMINALS

"Terminals on Inland Waterways." Walter F. Schulz..... 253
See also Harbors

RIVERS

"A Unique Bridge Over a Unique River." C. D. Purdon..... 382
Discussion: 661, 862, 863, 954
Bank protection on Great Min River, China..... 397
Bank protection on the Mississippi River.....401, 815
"Better Control of the Lower Mississippi." J. P. Kemper..... 1021
Discussion: R. D. Goodrich, 1208; Ole P. Erickson, 1404
"Controlling Floods in China." E. W. Lane..... 165
Discussion: 328, 420
"Developing the Upper Mississippi. A Symposium. Hibbert M. Hill, Lenvik Ylvisaker..... 1352
Development of Mississippi River flood control..... 343
"Flood Control and Channel Maintenance on the Lower Mississippi River." Lytle Brown..... 815
Discussion: Hubert Engels, 1028
"Flood Control Studies in the Mississippi Valley." A Symposium. L. D. Worsham, George R. Clemens..... 258
Discussion: 658
"Four Modern Hydro-Electric Power Developments." A Symposium. Verne Gongwer, T. H. Carver, William D. Shannon, Lyman Griswold..... 1106
"Great Min River Irrigation Project." E. W. Lane..... 397
Discussion: 863, 951
"Improving the Brazos River." Milo P. Fox..... 287
Discussion: E. N. Noyes, 426; Thomas H. Jackson, 740; J. F. Coleman, C. E. Grunsky, 741
"Ingenuity of the Ancient Chinese." E. W. Lane..... 17
Discussion: 134, 327, 328, 420, 649
"Mississippi River—A National Flood Problem." J. F. Coleman..... 401
Discussion: 650, 652, 660, 741, 742
"New Water Laws in the Making." W. L. Stevenson and Charles E. Ryder.. 991
"Preventing Erosion Below Overflow Dams." Robert F. Ewald..... 527
Discussion: 867, 874, 949, 950
Regulations of the lower Mississippi. Hubert Engels..... 1396
"Surveys for River Studies." Gerard H. Matthes..... 839
"Terminals on Inland Waterways." Walter F. Schulz..... 253
"The Columbia River—for Irrigation and Power." A Symposium. John S. Butler, Ross K. Tiffany..... 1075
Discussion: Joseph Jacobs, 1207; C. E. Grunsky, 1285; Mortimer E. Cooley, 1286; J. C. MacDonald, 1396; D. C. Henny, 1404
See also Oil Pollution of Rivers and Harbors: Waterways

RIVETED JOINTS

"Designing Riveted Connections with Charts and Tables." Odd Albert.... 413

ROADS

See Highways

ROOFS

"Computing Stresses in A-Frames and Cantilever Chords." Harold S. Woodward..... 1394
"Erecting the World's Largest Roof." Wilbur J. Watson..... 71

ROYAL INSTITUTION OF GREAT BRITAIN

Faraday centenary celebrated..... 1143

RUN-OFF

"Cyclic Variations by Curve Reduction." Jesse W. Shuman..... 326
"National Aspects of the Drought." John C. Hoyt..... 1167
See also Rainfall

RUSSIAN ENGINEERING OPPORTUNITIES

See Employment

SAFETY CONGRESSES

National Safety Council Congress and Exposition..... 1216

SAFETY DEVICES AND MEASURES

Humanitarian movement in building Hoover Dam..... 963

SALARIES OF ENGINEERS

See Engineering Fees and Salaries

SAND

"Sand Movement and Beach Erosion." E. J. Dent..... 821

SEA WALLS

See Retaining Walls

SEA WATER

"Protecting Reinforced Concrete Against Deterioration by Sea Water." G. F. Nicholson..... 1243

SEPTIC TANKS

Primary sewage treatment works completed. (Grand Rapids, Mich.)..... 1374

SEWAGE DISPOSAL

"Choosing Filtering Materials." Report of Committee of Sanitary Engineering Division on Filtering Materials. William E. Stanley, James W. Armstrong, W. H. Dittoe, George B. Gascoigne, N. T. Veatch, Jr..... 1388
"Filtering Materials for Trickling Filters." William E. Stanley..... 113
Discussion: 424, 545
"Grand Rapids Improves Its Sanitation." A Symposium. Milton P. Adams, C. R. Velzy..... 1369
"Guiding Principles of the Activated Sludge Process." T. Chalkley Hatton..... 31
Discussion: W. E. Galligan, Gordon M. Fair, 45; Samuel A. Greeley, 552
"Norfolk's First Essentials for Sanitation." Walter H. Taylor, J. N. Chester..... 853
Discussion: 1028
"Novel Sludge Digestion Tanks Completed." A. M. Rawn..... 997
"Operating Filters to Remove Organic Growths." Charles C. Hommon.... 116
Discussion: 424, 545
"Practical Operation of Sewage Works." Final Report of Committee on Sewage Works Operation and Control of the Sanitary Engineering Division. C. E. Keefer, W. R. Copeland, A. L. Fales, J. A. Vogelson, F. H. Waring..... 91
Discussion: C. B. Hoover, Langdon Pearse, L. H. Enslow, W. D. Hatfield, C. C. Hommon, C. K. Calvert, A. H. Goodman, F. W. Mohlman, C. E. Wheeler, Jr., 94; W. Rudolfs, 331; Marvin B. Fierke, 332; Roy S. Lanphear, 553
"Results of Experimental Work on Sewage Disposal." Progress Report of Committee of Sanitary Engineering Division on New Jersey Sewage Experiments. George T. Hammond, William R. Copeland..... 860
"St. Paul Plans for the Future." A Symposium. George H. Herrold, William N. Carey, J. A. Childs..... 1327
"Selecting the Material to Prevent Clogging." (Trickling filters.) Frank Woodbury Jones..... 118
Discussion: 330, 331, 424, 545
"Trickling Filter Loadings." J. A. Childs, George J. Schroepfer..... 1391
"Wards Island Sewage Treatment Plant Begun." George W. Fuller..... 1260
"Western Pennsylvania's Engineering Progress." Morris Knowles..... 377
Discussion: 749, 866

SEWERAGE

"Norfolk's First Essentials for Sanitation." Walter H. Taylor, 3d, J. N. Chester..... 853
Discussion: 1028
"Grand Rapids Improves Its Sanitation." A Symposium. Milton P. Adams, C. R. Velzy..... 1369

SHORE PROTECTION (OCEAN)

"An Unusual Sea Wall Achievement." C. M. Cram..... 409
"Sand Movement and Beach Erosion." E. J. Dent..... 821

SILT

"Sand Trap for Canals Works on Vortex Principle." R. L. Parshall..... 419

SLABS

"A Deck Slab for Long-Span Bridges." Jack Davidon..... 1026

SLIDE RULES

"Simplifying Structural Steel Design." Vsevolod Khmelevsky..... 1128

SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION

Officers elected..... 1044
Requests names of engineers..... 346

SOILS

Bureau of Standards soil corrosion tests ... 1045
Definitions needed for soil science. Jacob Feld ... 1210
"Earth as a Basic Material of Construction." Charles H. Lee ... 1015
Discussion: Irving B. Crosby, 1285
"Engineering Problems in the Tropics." Carl B. Andrews ... 1184
"Foundation Problems and Their Solution." A Symposium. L. R. Viterbo, A. C. Everham, W. J. Newman, S. W. Bowen, O. E. Mogensen ... 301
Discussion: 654, 749, 868, 947
"Foundations for the Cleveland Union Terminal." C. P. Marsh ... 83
Report of Committee on Earths and Foundations ... 958

SPILLWAYS

"Flood Control and Channel Maintenance on the Lower Mississippi River." Lytle Brown ... 815
Discussion: 1028
"Reconstruction of a Large Spillway." Robert F. Ewald ... 709

STANDARDS, ENGINEERING

The Bureau of Standards ... 491, 660

STEEL

"An Unusual Framing Method." H. S. Woodward ... 542
"Arc Welding on Steel Buildings." Frank P. McKibben ... 37
Discussion: 134, 205, 206, 334, 426, 550
"Bank of Manhattan Company Building." Henry V. Spurr ... 472
Discussion: 743, 871, 1289
"Cracking of Reinforcing Bars at Cold Bends." T. Wyss ... 1266
Design of welded buildings. Leonard C. Jordan ... 864
Discussion: Anthony S. Coombs, 1034; H. L. Doolittle, 1136
"Movable Bridges." Otis E. Hovey ... 595, 747
Discussion: 1029
New pavement has steel base ... 53
"New York's Tallest Skyscraper." H. G. Balcom ... 467
Discussion: 743, 1289
Radium shows defects in steel ... 1303
"Simplifying Structural Steel Design." Vsevolod Khmelevsky ... 1128
"Wind Bracing in Tall Steel Buildings." Progress Report of Sub-Committee of Structural Division on Wind Bracing in Steel Buildings. C. R. Young, Clyde T. Morris, N. A. Richards, Francis P. Witmer ... 478
Discussion: 700, 870, 951, 952, 953, 1033, 1131, 1209, 1289

STEEL CASTINGS

Huge steel casting poured ... 568

STREAM CONTAMINATION

River pollution relieved and sewer system expanded ... 1369
Sewage disposal problems of the twin cities ... 1334

STREAM FLOW

See Water, Flow of, in Open Channels

STREET RAILWAYS

Municipal partnership in mass transportation ... 282, 422

STRUCTURES, THEORY OF

"Simple Model Checks Indeterminate Structure." J. Charles Rathbun ... 131

SUBWAYS

"Constructing World's Longest Subway Station." Howard F. Peckworth ... 607
Discussion: 865, 1031

SURVEYING

"A Device for Lining-in Between Two Fixed Points." L. P. Murphy ... 327
Astigmatism a cause of error in surveying. Jerome Fee ... 869
Discussion: Edmund Brittan, 1029; Floyd W. Hough, 1135
"Determination of Spherical Excess with a Calculating Machine." H. Fred Peterson ... 1282
"Flood Control Studies in the Mississippi Valley." A Symposium. L. D. Worsham, George R. Clemens ... 258
Discussion: 658
Geological Survey releases 20 Chicago Quadrangles ... 221
"Latitude and Departure Chart for Azimuth and Distance." Edward N. Whitney ... 1127
"Modernizing Triangulation Practice." William Bowie ... 189
Discussion: 428, 429, 430, 554, 555, 658, 659, 661
"Photographic Surveys of Hoover Dam Site." C. H. Birdseye ... 619
Discussion: Bruce C. Hill, 872; D. C. McConaughy, 1130
"Recovering and Identifying Original Government Section Corners." J. S. Dodds ... 1383
"Surveys for River Studies." Gerard H. Matthes ... 839
"The Three-Point Problem Simplified." James B. Goodwin ... 132, 332
"The Utility of Geodetic Control Surveys." R. S. Patton ... 836
Discussion: George F. Syme, 1033; Henry J. Sherman, 1034; William Bowie, 1132
U.S. Coast and Geodetic Survey ... 498
"Universal Leveling Rod Reduces Calculations." Fred Morley ... 645
Discussion: 953

SURVEYING, AERIAL

"Aerial Photography for Railroad Location." Millard A. Butler ... 841
"Aerial Survey for Transmission-Line Location." F. G. Dana ... 249
Discussion: E. R. Polley, 554
"Flood Control Studies in the Mississippi Valley." A Symposium. L. D. Worsham, George R. Clemens ... 258
Discussion: 658
Surveying and mapping methods. (Mississippi River.) ... 1357

SURVEYING INSTRUMENTS

"Aerial Photography for Railroad Location." Millard A. Butler ... 841
"Photographic Surveys of Hoover Dam Site." C. H. Birdseye ... 619
Discussion: 872, 1130
See also Levels

TERMINALS

See Railroad Terminals: River Terminals

TESTING MACHINES

Exhibit of testing apparatus of American Society for Testing Materials ... 964
The Bureau of Standards ... 491, 660

TIDES

"Estuary Tidal Prisms Related to Entrance Areas." Morrough P. O'Brien. 738

TIMBER

"Treated Lumber for Irrigation Structures." L. Murray Grant ... 1090

TRACK

"Cleveland Railroads Dedicate Union Terminal." H. D. Jouett ... 77
Discussion: 546
"De-Spiking Rails at Ten Miles an Hour." H. Jackson Tippet ... 1204
See also Rails

TRAFFIC

Coordination of terminals ... 280, 420, 660, 747, 869
"Designing State Highway Systems." T. H. Cutler ... 315
Discussion: 548, 872
"Detroit Builds Highways for the Future." Leroy C. Smith ... 939
"Factors in Selecting County Highways." Roy W. Jablonsky ... 319
"Factors in Successful Highway Operation." A Symposium. William J. Fox, E. E. East, L. I. Hewes, W. W. Crosby, Jacob L. Crane, Jr., Jay Downer, W. W. Horner, Daniel L. Turner ... 1118
Discussion: 1398, 1399
"Highway Grade Separations." H. A. Shuptrine ... 1195
"Highway Traffic Control." Maxwell Halsey ... 733
Discussion: 1032
"Highway Transport Problems." Maxwell Halsey ... 184
Discussion: 548, 652, 653
"Increasing the Vehicular Capacity of Manhattan's Bridges." Edward A. Byrne ... 933
Discussion: 1207
"Manhattan's Mid-Town Vehicular Tunnel." John R. Slattery ... 1172
Municipal partnership in mass transportation ... 282, 422
"Side Lights on Highway Economics." R. L. Morrison ... 1005
See also Transportation

TRAFFIC SIGNS AND SIGNALS

"Design of Pavement Signs for Traffic Control." C. J. Tilden ... 1281
"Highway Traffic Control." Maxwell Halsey ... 733
Discussion: 1032

TRANSMISSION LINES

See Power Transmission

TRANSPORTATION

"A Century of Progress in Civil Engineering." Anson Marston and Mark B. Morris ... 929
Coordination of terminals ... 280, 420, 660, 747, 869
"Developing Aerial Transport." A Symposium. V. P. Conroy, George C. Kenney, Kenneth Whiting ... 827
"Highway Transport Problems." Maxwell Halsey ... 184
Discussion: 548, 652, 653
"Increasing the Vehicular Capacity of Manhattan's Bridges." Edward A. Byrne ... 933
Discussion: 1207
Municipal partnership in mass transportation ... 282, 422
"Shaker Heights Develops Interurban Railroad." William E. Pease ... 88
"Side Lights on Highway Economics." R. L. Morrison ... 1005
"Solving Manhattan's Transportation Problem." Francis Lee Stuart ... 9
Discussion: H. M. Lewis, C. E. Smith, 44; John R. Slattery, Glenn S. Reeves, 329
"The Atlantic Intracoastal Waterway." G. R. Young ... 795
Discussion: 1129
"Transportation Facilities of a Modern Railroad." Elisha Lee ... 791
"Western Pennsylvania's Engineering Progress." Morris Knowles ... 377
Discussion: E. K. Morse, 749; Louis P. Blum, 866
See also Freight: Traffic

TRIANGULATION

"Modernizing Triangulation Practice." William Bowie ... 189
Discussion: J. G. Staack, 428; Earl Church, Floyd W. Hough, 429; C. M. Cade, Arthur D. Kidder, 430; T. P. Pendleton, J. K. Finch, 554; Clarence T. Johnston, 555; George F. Syme, 658; W. N. Brown, Noel J. Ogilvie, 659; R. H. Randall, 661
See also Surveying

TROPICS

"Engineering Problems in the Tropics." Carl B. Andrews ... 1184

TRUSSES

"Computing Stresses in A-Frames and Cantilever Chords." Harold S. Woodward ... 1394
"Loading Test on Wooden Bowstring Truss." Conrad E. Pantke ... 415
"Longest Continuous Railroad Trusses Yet Constructed." Wilson T. Ballard. 536
"New Method of Mechanical Analysis for Trusses." Anders H. Bull ... 181, 746
Discussion: Eugene W. Stern, J. A. L. Waddell, Harold E. Wessman, Gustav Lindenthal, 427
See also Bridges

TUNNEL SHIELDS

"Constructing the Detroit-Windsor Tunnel." S. A. Thoresen..... 613

TUNNEL VENTILATION

"Constructing the Detroit-Windsor Tunnel." S. A. Thoresen..... 613

TUNNELS

Brunel and his son build the Thames Tunnel..... 1143
"Constructing the Detroit-Windsor Tunnel." S. A. Thoresen..... 613
"Increasing the Vehicular Capacity of Manhattan's Bridges." Edward A. Byrne..... 933
Discussion: 1207
"Manhattan's Mid-Town Vehicular Tunnel." John R. Slattery..... 1172
"Solving Manhattan's Transportation Problem." Francis Lee Stuart..... 9
Discussion: 44, 329

TURBINES (WATER)

"Record Hydro-Electric Turbine Installed." John P. Hogan..... 519
Discussion: J. C. Balcomb, 740; Eugene E. Halmos, 947; J. D. Whittemore, Lawrence Grant White, 948; R. V. Terry, 1136

UNDERGROUND PIPE PROTECTION INSTITUTE

Work of..... 343

UNDERPINNING

"A Successful Underpinning Experience." Henry Wise..... 42
"Constructing World's Longest Subway Station." Howard F. Peckworth..... 607
Discussion: 865, 1031
See also Foundations

UNITED ENGINEERING TRUSTEES, INC.

Function of..... 654
Funds for research available..... 1215
Name changed from Engineering Foundation, Inc..... 440

UNITED STATES GOVERNMENT

Aviation facilities on naval carriers..... 834
Bureau of Standards soil corrosion tests 1045
Civil engineering news of the federal government..... 1039
Consultants for U.S. Army Corps of Engineers..... 54
Eyes of the Army..... 831
"Federal Bureaus Aid the Profession." A Symposium. Julian D. Sears, George K. Burgess, Thomas H. MacDonald, Lytle Brown, R. S. Patton, S. H. McCrory..... 489, 660
Geological Survey releases twenty Chicago quadrangles..... 221
Publication of Water Supply papers.... 212
"Recovering and Identifying Original Government Section Corners." J. S. Dodds..... 1383
"The National Hydraulic Laboratory at the Bureau of Standards." George K. Burgess..... 911

VEREIN DEUTSCHER INGENIEURE

Celebrates anniversary..... 964, 1040

VIADUCTS

"Foundations for the Cleveland Union Terminal." C. P. Marsh..... 83
Use of high stress concrete in viaduct construction..... 1401

WALLS

The Great Wall of China..... 19, 547

WASHINGTON'S BIRTHPLACE

Engineers solicited for restoration of Washington's boyhood home..... 1216

WATER, FLOW OF, IN OPEN CHANNELS

"Estuary Tidal Prisms Related to Entrance Areas." Morrough P. O'Brien 738
"Great German Hydraulic Laboratory." Hunter Rouse..... 715
"Problems of Water Measurement." A Symposium. J. C. Stevens, L. Standish Hall, Fred C. Scobey..... 1095
Discussion: 1283, 1289
"Reconstruction of a Large Spillway." Robert F. Ewald..... 709

WATER, FLOW OF, IN PIPES

"Problems of Water Measurement." A Symposium. J. C. Stevens, L. Standish Hall, Fred C. Scobey..... 1095
Discussion: 1283, 1289

WATER, FLOW OF, OVER DAMS AND WEIRS

"A Simplified Hydraulic Jump Formula." Karl R. Kennison..... 543
"Preventing Erosion Below Overflow Dams." Robert F. Ewald..... 527
Discussion: 867, 874, 949, 950
"Problems of Water Measurement." A Symposium. J. C. Stevens, L. Standish Hall, Fred C. Scobey..... 1095
Discussion: Morrough P. O'Brien, 1283; H. B. Muckleston, 1289
"Rapid Calculation for Reservoir Discharge." R. D. Goodrich..... 417
"Reconstruction of a Large Spillway." Robert F. Ewald..... 709

WATER LAWS

"New Water Laws in the Making." W. L. Stevenson, and Charles E. Ryder..... 991

WATER MEASUREMENT

See Gages: Water, Flow of: Water Meters

WATER METERS

"Great German Hydraulic Laboratory." Hunter Rouse..... 715

WATER PIPE

See Pipe

WATER POWER

"The Columbia River—for Irrigation and Power." A Symposium. John S. Butler, Ross K. Tiffany..... 1075
Discussion: 1207, 1285, 1286, 1396, 1404

WATER PURIFICATION

"Choosing Filtering Materials." Report of Committee of Sanitary Engineering Division on Filtering Materials. William E. Stanley, James W. Armstrong, W. H. Dittoe, George B. Gascoigne, N. T. Veatch, Jr..... 1388
Developing the city's water supply.... 274, 425, 551, 654, 655
"Purifying Water for Domestic Use." Robert Spurr Weston..... 197
Discussion: E. Sherman Chase, 550; J. F. Laboon, 655; Herbert F. Salmond, 656; A. E. Griffin, 866

WATER SUPPLY

"As Cheap As Water." C. B. Hoover 1027
"Colorado River Aqueduct." F. E. Weymouth..... 371
Developing the city's water supply.... 274, 425, 551, 654, 655
"New Water Laws in the Making." W. L. Stevenson, and Charles E. Ryder..... 991
"Western Pennsylvania's Engineering Progress." Morris Knowles..... 377
Discussion: 749, 866

WATER WORKS

Chicago's lake front park has special water system..... 1302
Developing the city's water supply.... 274, 425, 551, 654, 655
"Norfolk's First Essentials for Sanitation." Walter H. Taylor, J. N. Chester..... 853
Discussion: Asher Atkinson, Ezra B. Whitman, 1028

WATERWAYS

"Bridge Clearances Over Navigable Waterways." J. F. Coleman..... 1364
"Bridges over Navigable Waters." Report of Bridge Legislation Committee American Engineering Council. H. S. Crocker, V. H. Cochrane, A. H. Fuller, A. P. Greensfelder, F. M. Gunby, J. L. Harrington, D. B. Steinman..... 175
"Chesapeake Bay Port Developments." A Symposium. Joseph D. Arthur, Jr., Warren T. Hannum, J. Gordon Bohannan..... 801
"The Atlantic Intracoastal Waterway." G. R. Young..... 795
Discussion: O. P. Erickson, 1129
The Corps of Engineers of the Army... 496
See also Canals: Harbors: Rivers

WAVES

"Sand Movement and Beach Erosion." E. J. Dent..... 821

WEATHER

See Meteorology

WELDING

"Arc Welding on Steel Buildings." Frank P. McKibben..... 37
Discussion: H. W. Hayward, 134; F. T. Llewellyn, H. M. Priest, 205; J. L. Faden, Stacey H. Widdicombe, 206; W. L. Warner, 334; Ole P. Erickson, 426; A. F. Davis, 550
Design of welded buildings. Leonard C. Jordan..... 864
Discussion: Anthony S. Coombs, 1034; H. L. Doolittle, 1136

WELLS

"Marine Oil Well Construction." T. Farrance Davey..... 721

WIND BRACING

"Bank of Manhattan Company Building." Henry V. Spurr..... 472
Discussion: 743, 871, 1289
"New York's Tallest Skyscraper." H. G. Balcom..... 467
Discussion: 743, 1289
"Wind Bracing in Tall Steel Buildings." Progress Report of Sub-Committee of Structural Division on Wind Bracing in Steel Buildings. C. R. Young, Clyde T. Morris, N. A. Richards, Francis P. Witmer..... 478
Discussion: David C. Coyle, Albert Smith, Robins Fleming, Aubrey Weymouth, G. A. Maney, H. V. Spurr, E. P. Goodrich, W. M. Wilson, H. L. Dryden, LeRoy W. Clark, 700; J. Patterson, P. L. Pratley, Rolland A. Phillco, 870; Eugene W. Stern, 951; S. P. Wing, C. M. Goodrich, 952; Sheldon A. Keast, 953; I. F. Morrison, 1033; G. H. Hutchinson, 1131; Frank W. Chappell, 1209; S. B. Punyagupta, 1289

WIND PRESSURE

"Erecting the World's Largest Roof." Wilbur J. Watson..... 71
"Wind Bracing in Tall Steel Buildings." Progress Report of Sub-Committee of Structural Division on Wind Bracing in Steel Buildings. C. R. Young, Clyde T. Morris, N. A. Richards, Francis P. Witmer..... 478
Discussion: 700, 870, 951, 952, 953, 1033, 1131, 1209, 1289

WINDMILLS

Chinese windmills..... 17, 327

WINTER CONSTRUCTION

"Twelve-Month Construction." James S. Taylor..... 322
Discussion: A. J. Hammond, 551; A. P. Greensfelder, 748; Norman M. Stineman, 749; Albert F. Reichmann, 874; E. A. Hadley, 946

WIRE ROPE

"Heavy Duty Wire Ropes and Sheaves." B. R. Leffler..... 107
Discussion: Casper D. Meals, 110, 209; R. C. Strachan, 111; W. H. Fulweiler, 428; O. G. Julian, 547

WOOD PIPE

"Old Wood Pipe Stands Severe Test." F. W. Greve..... 1204

WORLD WAR

Eyes of the Army..... 831

ZONING OF CITIES

"Executing Chicago's Regional Plan." Robert Kingery..... 1366
"Some City Planning Problems of Tacoma." C. E. Putnam..... 1104
Discussion: 1401

NAME INDEX

ADAMS, MILTON P.
"River Pollution Relieved and Sewer System Expanded" (Grand Rapids, Mich.) ... 1369

ALBERT, ODD
"Designing Riveted Connections with Charts and Tables" ... 413
"Graphical Spacing of Stirrups in Concrete Beams" ... 1395
"Short Cuts in Designing Reinforced Concrete Beams" ... 646

ALBRIGHT, C. S.
"Electrical Operation of Car Dumper" ... 103

ALLEN, C. C.
Professional standing of Junior Members 133

ANDREWS, CARL B.
"Engineering Problems in the Tropics" 1184

ARMSTRONG, JAMES W.
"Cooperative Filter Sand Experiments" 1389
"Choosing Filtering Materials" ... 1388

ARTHUR, JOSEPH D., JR.
"The Waterways of the National Capital" ... 801

BABCOCK, C. M.
"Highway Parasites" ... 1380

BAKER, DONALD M.
"Registration of Civil Engineers in California" ... 1201

BALCOM, H. G.
"New York's Tallest Skyscraper" ... 467

BALLARD, WILSON T.
"Longest Continuous Railroad Trusses Yet Constructed" ... 536

BEANFIELD, R. McC.
Awarded Thomas Fitch Rowland Prize 136, 336

BEATTY, P. A.
"How Arbitration Works" ... 849

BENNETT, RUSSELL H.
"Trend of Mining and Concentrating Practice" ... 1345

BIRDSEYE, C. H.
"Photographic Surveys of Hoover Dam Site" ... 619

BLACK, E. B.
Brief sketch of ... 1411

BOHANNAN, J. GORDON
"The Port of Hampton Roads" ... 808

BOWEN, S. W.
"Use of Caissons in St. Louis Sub-Soil" 309

BOWIE, WILLIAM
"Modernizing Triangulation Practice" 189

BROOKS, ROBERT B.
"Present Status of Prequalification" ... 293

BROWN, EARLE
"Training a Highway Patrol" ... 1382

BROWN, LYTLE
"Flood Control and Channel Maintenance on the Lower Mississippi River" ... 815
"The Corps of Engineers of the Army" ... 496

BROWN, WENDELL P.
"Structural Design and Details." (Car Dumper at Toledo, Ohio.) ... 105

BRUNEL, MARK I.
Brunel and his son build Thames Tunnel. 1143

BUCK, HENRY ROBINSON
Brief sketch of ... 214

BUDD, RALPH
"Developing the Pacific Northwest" ... 1071

BULL, ANDERS H.
"New Method of Mechanical Analysis for Trusses" ... 181, 746

BURGESS, GEORGE K.
"The Bureau of Standards" ... 491, 660
"The National Hydraulic Laboratory at the Bureau of Standards" ... 911, 660

BUTLER, JOHN S.
"Comprehensive Study by Army Engineers." (Columbia River for irrigation and power.) ... 1075

BUTLER, MILLARD A.
"Aerial Photography for Railroad Location" ... 841

BYRNE, EDWARD A.
"Increasing the Vehicular Capacity of Manhattan's Bridges" ... 933

CAMPBELL, FRANK B.
Supply of civil engineers in excess of demand ... 1135

CAREY, WILLIAM N.
"Five-Year Construction Program Adopted" ... 1330

CARSON, HOWARD ADAMS
Obituary ... 1407

CARVER, T. H.
"Skagit River Developed by Seattle" ... 1110

CHAGNAUD, LEON-JEAN
Obituary ... 216

CHASE, JOHN H.
"Cheap Power from Natural Gas" ... 917

CHESTER, JOHN NEEDELS
Brief sketch of ... 213
"Developing the Water Supply." (Norfolk, Va.) ... 858

CHILDS, J. A.
"Trickling Filter Loadings" ... 1391
"Sewage Disposal Problems of the Twin Cities" ... 1334

CHRISTIE, WARD P.
"Protection Against Unscrupulous Practices" ... 298

CLARK, LeROY W.
Making tests on models of a hangar ... 708

CLEMENS, GEORGE R.
"Flood Control Mapping by Aerial Methods" ... 263

COCHRANE, V. H.
"Bridges Over Navigable Waters" ... 175

COLEMAN, J. F.
"A Great Progressive Step" ... 2
"Bridge Clearances Over Navigable Waterways" ... 1364
"Mississippi River—A National Flood Problem" ... 401

COLLINS, FRANCIS W.
Highway expenditures must be economically justifiable ... 1399

CONROY, V. P.
"Commercial Transportation" ... 827

COPELAND, WILLIAM R.
"Practical Operation of Sewage Works". 91
"Results of Experimental Work on Sewage Disposal" ... 860

CORNELL, C. B.
Awarded James Laurie Prize ... 136, 336

COYLE, DAVID C.
Relation between motion and sensation. 700

CRAM, C. M.
"An Unusual Sea Wall Achievement" ... 409

CRANE, JACOB L., Jr.
"Progress Report of the Committee on Street Thoroughfares Manual of the City Planning Division" ... 1125

CROCKER, H. S.
"Bridges Over Navigable Waters" ... 175
Brief sketch of ... 1409

CROSBY W. W.
"Progress Report of the Committee on Street Thoroughfares Manual of the City Planning Division" ... 1125

CRUM, R. W.
"Financing Street and Highway Improvements" ... 532

CUTLER, T. H.
"Designing State Highway Systems" ... 315

DANA, F. G.
"Aerial Survey for Transmission-Line Location" ... 249

DARLING, W. L.
"Railroading in the Northwest" ... 1340

DAVEY, T. FARRANCE
"Marine Oil Well Construction" ... 721

DAVIDON, JACK
"A Deck Slab for Long Span Bridges" ... 1026

DAVIS, ALBION
Awarded Norman Medal ... 1292

DAVIS, CALVIN V.
"Recent Advances in Buttress-Type Dams" ... 387

DAVIS, E. W.
"Economics of the Minnesota Iron Mining Industry" ... 1349

DENT, E. J.
"Sand Movement and Beach Erosion" ... 821

DITTOE, W. H.
"Choosing Filtering Materials" ... 1388

DODDS, J. S.
"Recovering and Identifying Original Government Section Corners" ... 1383

DOWNER, JAY
"Progress Report of the Committee on Street Thoroughfares Manual of the City Planning Division" ... 1125

DOWNEY, S. B.
Partially supported columns ... 1137

DRYDEN, H. L.
Effect of shape of buildings ... 707

DUNN, C. P.
"Blasting a Precast Dam into Place" ... 159, 334

EAST, E. E.
"By-Passing Traffic Around Small Towns" ... 1120

EDDY, C. T.
Awarded Alfred Noble Prize ... 1293

EMERY, F. E.
"Using Burned Clay Masonry" ... 1189

ENGELS, HUBERT
Regulation of the lower Mississippi ... 1396

ENGER, M. L.
Brief sketch of ... 1410

EVERHAM, ARTHUR C.
"When to Use Piling" ... 304

EWALD, ROBERT F.
"Preventing Erosion Below Overflow Dams" ... 527
"Reconstruction of a Large Spillway" ... 709

FALES, A. L.
"Practical Operation of Sewage Works". 91

FARADAY, MICHAEL
Centenary celebration ... 1142

FEE, JEROME
Astigmatism a cause of error in surveying ... 869

FELD, JACOB
Definitions needed for soil science ... 1210

FERGUSON, S. F.
"Road Building on Dredger Fill" ... 638

FLEMING, ROBINS
Redesign of wind bents impracticable ... 702

FLINN, ALFRED D.
"Research Advances Civil Engineering" 14

FOX, MILO P.
"Improving the Brazos River" 287

FOX, WILLIAM J.
"Population Density Related to Roadway Area" 1118

FREEMAN, JOHN RIPLEY
Awarded J. James R. Croes Medal 1292
Brief sketch of 70

FULLER, A. H.
"Bridges Over Navigable Waters" 175

FULLER, GEORGE W.
"Wards Island Sewage Treatment Plant Begun" 1260

GANDOLFO, J. H.
"Tracing the Engineer in Early Egypt and Assyria" 632

GASCOIGNE, GEORGE B.
"Choosing Filtering Materials" 1388

GEPHART, W. F.
"Why the City" 267

GERRY, M. H., JR.
"Safety Limitations of the Hoover Dam" 921

GIBBS, GEORGE
Awarded Arthur M. Wellington Prize 336

GILKEY, HERBERT J.
"New Formula for Concrete Columns Needed" 924

GONGWER, VERNE
"Tacoma Completes Second Cushman Plant" 1106

GONNERMAN, H. F.
"Researches in Concrete Aid the Engineer" 727

GOODRICH, ERNEST P.
Observations on size of gusts 706
"The Engineer's Salary and Budget" 1211

GOODRICH, R. D.
"Rapid Calculation for Reservoir Discharge" 417

GOODWIN, JAMES B.
"The Three-Point Problem Simplified" 132, 332

GRANT, L. MURRAY
"Treated Lumber for Irrigation Structures" 1090

GRANT, U. S., 3d
"More Proof That City Planning Pays" 507

GREELEY, SAMUEL A.
Awarded Thomas Fitch Rowland Prize 1293

GREENSFELDER, A. P.
"Bridges Over Navigable Waters" 175
"Supervised Regional Expansion" 70

GREENWAY, JOHN C.
Memorial to 142

GREGORY, JOHN H.
Awarded James Laurie Prize 136, 336
Brief sketch of 1410

GREVE, F. W.
"Old Wood Pipe Stands Severe Test" 1204

GRISWOLD, LYMAN
"Ariel Dam on the Lewis River" 1115

GRUNSKY, C. E.
"Honeycomb Gravity-Type Concrete Dams" 630
"The Way to National Progress and Prosperity" 1182

GUNBY, F. M.
Bridges over Navigable Waters" 175

HALL, L. STANDISH
"Improving the Accuracy of Instruments" 1098

HALSEY, MAXWELL
"Highway Traffic Control" 733
"Highway Transport Problems" 184

HAMMOND, ALONZO J.
"Development of Railroad Passenger Terminals" 1176

HAMMOND, GEORGE T.
"Results of Experimental Work on Sewage Disposal" 860

HAMMOND, H. P.
"Educating the Civil Engineer" 1269

HANNUM, WARREN T.
"The Port of Baltimore—Fourth in Tonnage" 805

HARRINGTON, J. L.
"Bridges Over Navigable Waters" 175

HATFIELD, WILLIAM D.
Awarded Thomas Fitch Rowland Prize 1293

HATTON, T. CHALKLEY
"Guiding Principles of the Activated Sludge Process" 31

HAZEN, ALLEN
Memorial to 55

HEBARD, R. W.
"Report of Committee on Engineering Employment in Russia" 755

HEDBERG, JOHN
"A Highly Sensitive Device for Measuring Stresses and Deflections" 540

HENNY, D. C.
Brief sketch of 1409

HENRY, PHILIP W.
"Report of Committee on Engineering Employment in Russia" 755

HERRMANN, FREDERICK CHARLES
Brief sketch of 215

HERROLD, GEORGE H.
"The Necessity for Coordinated Planning" 1327

HEWES, L. I.
"Increasing Highway Efficiency" 1123

HILL, HIBBERT M.
"Plans for Deepening Existing Channel." (Mississippi River.) 1352

HOFFMAN, ROBERT
Brief sketch of 1411

HOGAN, JOHN P.
"Record Hydro-Electric Turbine Installed" 519

HOLCOMB, A. E.
"Output Factors for Excavation and Material-Handling Equipment" 26

HOLLERAN, LESLIE GILBERT
Brief sketch of 214

HOMMON, CHARLES C.
"Operating Filters to Remove Organic Growths" 116

HOOVER, C. B.
"As Cheap as Water" 1027
Awarded James Laurie Prize 136, 336

HOOVER, HERBERT
Boulder Dam renamed for 54
Supporting President Hoover 1295

HORNER, W. W.
"Natural Water Courses as Municipal Assets" 277
Progress Report of the Commmittee on Street Thoroughfares Manual of the City Planning Division 1125

HOUK, IVAN E.
"Checking Arch Dam Designs with Models" 695

HOVEY, OTIS E.
"Movable Bridges" 595, 747

HOYT, JOHN C.
"National Aspects of the Drought" 1167

HUNT, CHARLES WARREN
James Laurie and the Formation of the Society 220
The United Engineering Trustees, Inc. 654

JABLONSKY, ROY W.
"Factors in Selecting County Highways" 319

JONAH, F. G.
"Coordination of Terminals" 280

JONES, FRANK WOODBURY
"Selecting the Material to Prevent Clogging." (Trickling filters.) 118

JORDAN, LEONARD C.
Design of welded buildings 864

JOUETT, H. D.
"Cleveland Railroads Dedicate Union Terminal" 77

KAMPF, MORRIS
Shall the civil engineer lose the right to design buildings? 945

KEEFER, C. E.
"Practical Operation of Sewage Works" 91

KEITH, SCOTT
"Bidding Security Desired for Construction Work" 541

KEMPER, J. P.
"Better Control of the Lower Mississippi" 1021

KENNEY, GEORGE C.
"The Eyes of the Army" 831

KENNISON, KARL R.
"A Simplified Hydraulic Jump Formula" 543

KHMELEVSKY, VSEVOLOD
"Simplifying Structural Steel Design" 1128

KINGERY, ROBERT
"Executing Chicago's Regional Plan" 1366

KINSEY, E. R.
"Municipal Preparedness" 269

KINSLEY, THOMAS P.
Brief sketch of 138

KIPP, O. L.
"Questions of Location and Design." (Highway practice in Minnesota.) 1378

KITTREDGE, GEORGE W.
Brief sketch of 1406
"Report of Committee on Engineering Employment in Russia" 755

KNOWLES, MORRIS
"Western Pennsylvania's Engineering Progress" 377
"The Civil Engineer's Part in the City Plan" 524

KRAMER, HANS
Freeman Fund Traveling Scholarship awarded to 345, 965

KRIEGE, HERBERT F.
"An Accelerated Soundness Test" 120

LANCHESTER, FREDERICK WILLIAM
Awarded Guggenheim Medal for Aeronautics 884

LANE, E. W.
"Controlling Floods in China" 165
"Great Min River Irrigation Project" 397
"Ingenuity of the Ancient Chinese" 17

LAURIE, JAMES
Brief sketch of 158
James Laurie and the formation of the Society 220

LEE, CHARLES H.
"Earth as a Basic Material of Construction" 1015

LEE, ELISHA
"Transportation Facilities of a Modern Railroad" 791

LEFFLER, B. R.
"Heavy Duty Wire Ropes and Sheaves" 107

LOCKWOOD, R. J.
"Municipal Partnership in Mass Transportation" ... 282

LOW, EMIL
A close call ... 1218

LUIGGI, LUIGI
Obituary ... 564, 667

LUPFER, E. P.
Brief sketch of ... 1410

MacDONALD, THOMAS H.
"The Bureau of Public Roads" ... 494

McCRORY, S. H.
"The Division of Agricultural Engineering" ... 501

McCRORY, T. G.
"Lake Union Bridge Completed" ... 1092

McDANIEL, ALLEN B.
Let the engineer help himself ... 207

McDONALD, F. H.
"The New Competition and New Horizons in Engineering" ... 1361

McHENRY, EDWIN H.
Bequeaths funds for research ... 1215
The story of Homestake Pass ... 1301

McKESSON, C. L.
"Asphaltic Emulsions for Economical Highways" ... 1255

McKIBBEN, FRANK P.
"Arc-Welding on Steel Buildings" ... 37

McMILLAN, F. R.
"Basic Principles of Concrete Making" 601

MAGNUSON, H. E.
"Safeguarding Industry Against Fire" .. 392

MANEY, G. A.
Self-recording deflection apparatus needed ... 704

MARSH, C. P.
"Foundations for the Cleveland Union Terminal" ... 83

MARSTON, ANSON
"A Century of Progress in Civil Engineering" ... 9 9

MATTHES, GERARD H.
"Surveys for River Studies" ... 839

MAUGH, L. C.
"Computing Moments in Continuous Beams" ... 202

MEAD, CHARLES ADRIANCE
Brief sketch of ... 214

MEAD, DANIEL W.
Brief sketch of ... 1406

MEAD, ELWOOD
"A Conservative Design." (Hoover Dam.) ... 1001
"Hoover Dam" ... 3

MENDENHALL, HERBERT DRUMMOND
Brief sketch of ... 215

MERRIMAN, THADDEUS
"Logic in Engineering Diagnosis" ... 625

MODJESKI, RALPH
Recipient of Washington Award ... 568, 667

MOGENSEN, O. E.
"A Caisson Foundation Job" ... 311

MOORE, H. F.
"Quest of Elasticity" ... 171

MORLEY, FRED
"Universal Leveling Rod Reduces Calculations" ... 645

MORRIS, CLYDE T.
"Wind Bracing in Tall Steel Buildings" .. 478

MORRIS, MARK B.
"A Century of Progress in Civil Engineering" ... 929

MORRISON, R. L.
"Side Lights on Highway Economics" .. 1005

MORSE, EDWIN KIRTLAND
Brief sketch of ... 214
Rope friction saves a bridge ... 1416

MURPHY, L. P.
"A Device for Lining-in Between Two Fixed Points" ... 327

NADAI, A.
Author of monograph "Plasticity" ... 1142

NAGLER, FLOYD A.
Awarded Norman Medal ... 1292

NEWMAN, W. J.
"Chicago Open-Well Method." (Foundations.) ... 306

NICHOLSON, G. F.
"Protecting Reinforced Concrete Against Deterioration by Sea Water" ... 1243

O'BRIEN, MORROUGH P.
"Estuary Tidal Prisms Related to Entrance Areas" ... 738

PANTKE, CONRAD E.
"Loading Test on Wooden Bowstring Truss" ... 415

PARRISH, ALAN JAY
"Practical Applications of the System" (Prequalification of contractors.) ... 295

PARSHALL, R. L.
"Sand Trap for Canals Works on Vortex Principle" ... 419

PARSONS, H. de B.
Awarded J. James R. Croes Medal ... 136, 336

PATTON, R. S.
"The Utility of Geodetic Control Surveys" ... 836
"U.S. Coast and Geodetic Survey" ... 498

PEASE, WILLIAM E.
"Shaker Heights Develops Interurban Railroad" ... 88

PECKWORTH, HOWARD F.
"Constructing World's Longest Subway Station" ... 607

PEGRAM, GEORGE H.
Brief sketch of ... 1406
"Report of Committee on Engineering Employment in Russia" ... 755

PETERSON, H. FRED
"Determination of Spherical Excess with a Calculating Machine" ... 1282

PITNEY, MARSHALL
"A Successful Highway Toll-Bridge Project" ... 194

PUPIN, MICHAEL I.
Awarded John Fritz Medal ... 1294

PURDON, C. D.
"A Unique Bridge Over a Unique River" ... 382

PURVER, GEORGE M.
The engineer and Russia ... 547

PUTNAM, C. E.
"Some City Planning Problems of Tacoma" ... 1104

RAEDER, WARREN
"New Formula for Concrete Columns Needed" ... 924

RATHBUN, J. CHARLES
"Simple Model Checks Indeterminate Structure" ... 131

RAWN, A. M.
"Novel Sludge Digestion Tanks Completed" ... 997

RHODES, G. I.
"Natural Gas for Steam Power" ... 513

RICE, R. E.
"Electrical Operation of Car Dumper". 103

RICHARDS, ARTHUR
"Large Turnover in City Managerships" ... 641

RICHARDS, N. A.
"Wind Bracing in Tall Steel Buildings" 478

RICKETTS, PALMER C.
Brief sketch of ... 1406

RIGGS, H. E.
Brief sketch of ... 1410
Personal aspects of Society membership 1407

RITCHIE, EDWARD W.
Bargains in engineering ability ... 650

ROUSE, HUNTER
"Great German Hydraulic Laboratory". 715

RYDER, CHARLES E.
"New Water Laws in the Making" ... 991

SAVAGE, J. L.
"Checking Arch Dam Designs with Models" ... 695

SCHLESINGER, GEORGE F.
Awarded Arthur M. Wellington Prize .. 1293

SCHROEPFER, GEORGE J.
"Trickling Filter Loadings" ... 1391

SCHULZ, WALTER F.
"Terminals on Inland Waterways" ... 253

SCOBEY, FRED C.
"Unusual Flow Phenomena" ... 1101

SEARS, JULIAN D.
"The Geological Survey" ... 489

SHANNON, WILLIAM D.
"Rock Island Development—Columbia River" ... 1111

SHAW, ARTHUR M.
The Hangchow sea wall ... 649

SHERMAN, CHARLES W.
What is a project? ... 546

SHIBA, BARON CHUZABURO
Visit to United States ... 143

SHIRLEY, HENRY G.
"Convict Labor in Highway Construction" ... 812

SHUMAN, JESSE W.
"Cyclic Variations by Curve Reduction" ... 326

SHUPTRINE, H. A.
"Highway Grade Separations" ... 1195

SLATTERY, JOHN R.
"Manhattan's Mid-Town Vehicular Tunnel" ... 1172
"Report of Committee on Engineering Employment in Russia" ... 755

SLEIGHT, REUBEN B.
Granted American Superpower Corporation Award ... 143

SMITH, ALBERT
Higher wind pressures recommended ... 701

SMITH, AUGUSTUS
More clearance under drawbridges ... 1283

SMITH, ELDRED D.
"Brook's Hollow Earth-Fill Dam" ... 405

SMITH, LEROY C.
"Detroit Builds Highways for the Future" ... 939

SMITH, MERRITT H.
Memorial to ... 53

SMITH, WALDO E.
"Byzantine Aqueduct Still in Use" ... 1249

SPURR, HENRY V.
"Bank of Manhattan Company Building" ... 472
Column shortening and design loads ... 705

STANLEY, WILLIAM E.
"Choosing Filtering Materials"..... 1388
"Filtering Materials for Trickling Filters"..... 113

STEINMAN, D. B.
"Bridges Over Navigable Waters"..... 175
"Rope Strands for Long Suspension Span"..... 1087

STEMM, H. J.
What the Society can do for the Junior member..... 333

STEVENS, CHARLES H.
"Advantages to Be Gained." (Arbitration in public works contracts.)..... 847

STEVENS, J. C.
Brief sketch of..... 1411
"Models Predict Flow Through Structures."..... 1095

STEVENS, JOHN F.
Novel honor for..... 224

STEVENSON, W. L.
"New Water Laws in the Making"..... 991

STINCHCOMB, WILLIAM A.
"Metropolitan Park Improvements Pay"..... 123

STOCKER, J. A.
"Loading Six Million Tons of Coal"...99, 207

STRANDBERG, G. R.
"The Osage Hydro-Electric Project".. 243

STUART, FRANCIS LEE
Brief sketch of.....213, 432
"Engineers' Opportunities"..... 1337
"Inaugural Address"..... 557
"Solving Manhattan's Transportation Problem"..... 9

SUYEHIRO, K.
To lecture in the United States.....222, 1300

SWAIN, GEORGE F.
Obituary.....1040, 1295

SWASEY, AMBROSE
Gift to Engineering Foundation..... 1044

TAYLOR, DAVID WATSON
Awarded John Fritz Medal..... 143

TAYLOR, JAMES S.
"Twelve-Month Construction"..... 322

TAYLOR, WALTER H., 3d
"Sewerage and Water Supply." (Norfolk, Va.)..... 853

TERZAGHI, CHARLES
Awarded Norman Medal.....136, 336

THOMPSON, WELLS N.
"Modern Factory Built in Northern Korea"..... 1275

THORESEN, S. A.
"Constructing the Detroit-Windsor Tunnel"..... 613

TIFFANY, ROSS K.
"Irrigation—A National Problem"..... 1081

TILDEN, C. J.
"A Summary of the Present State of Prequalification"..... 504
"Design of Pavement Signs for Traffic Control"..... 1281

TIPPET, H. JACKSON
"De-Spiking Rails at Ten Miles an Hour"..... 1204

TRUMPOUR, F. J.
"Conservation in Blue Printing"..... 644

TURNER, DANIEL L.
"Progress Report of the Committee on Street Thoroughfares Manual of the City Planning Division"..... 1125

TUTTLE, ARTHUR S.
Brief sketch of..... 1409

VALDES, AUGUSTIN M.
"A Modern Mexican Irrigation Development"..... 1009

VEATCH, N. T., JR.
"Choosing Filtering Materials"..... 1388

VELZY, C. R.
"Primary Sewage Works Completed. (Grand Rapids, Mich.)..... 1374

VINCI, LEONARDO da
Life and work of..... 1218

VITERBO, L. R.
"Spread Footings and Floating Foundations"..... 301

VOGELSON, J. A.
"Practical Operation of Sewage Works". 91

WADDELL, J. A. L.
A Latin-American engineering and construction enterprise..... 1283
Awarded Clausen Medal.....143, 568

WAITE, HENRY MATSON
Brief sketch of..... 213

WALL, EDWARD E.
"Developing the City's Water Supply". 274

WALLIS, ROLLAND S.
"Making the Most of the City Plat"... 127

WARING, F. H.
"Practical Operation of Sewage Works". 91

WASHINGTON, GEORGE
Restoration of boyhood home contemplated..... 1216

WATSON, WILBUR J.
"Erecting the World's Largest Roof.... 71

WEBSTER, GEORGE S.
Obituary.....564, 877

WESTERGAARD, H. M.
"Safety of Hoover Dam"..... 1003

WESTON, ROBERT SPURR
"Purifying Water for Domestic Use"... 197

WEYMOUTH, AUBREY
More wind pressure data required..... 704

WEYMOUTH, F. E.
"Colorado River Aqueduct"..... 371

WHEAT, GEORGE G.
"Improvements in Handling Building Material"..... 484

WHITING, KENNETH
"Aviation Facilities on Naval Carriers" 834

WHITNEY, EDWARD N.
"Latitude and Departure Chart for Azimuth and Distance"..... 1127

WICKENDEN, W. E.
"Professional Status of the Engineer".. 23

WILSON, W. M.
Importance of wind bracing connections. 707

WISE, HENRY
"A Successful Underpinning Experience"..... 42

WITMER, FRANCIS P.
"Wind Bracing in Tall Steel Buildings" 478

WOODWARD, H. S.
"An Unusual Framing Method"..... 542
"Computing Stresses in A-Frames and Cantilever Chords"..... 1394

WORSHAM, L. D.
"Arkansas River Mapped by Ground Methods"..... 258

WYSS, T.
"Cracking of Reinforcing Bars at Cold Bends"..... 1266

YLVISAKER, LENVIK
"Surveying and Mapping Methods"... 1357

YOUNG, C. R.
"Wind Bracing in Tall Steel Buildings" 478

YOUNG, G. R.
"The Atlantic Intracoastal Waterway" 795

ZASS, W. W.
"Qualification Principles Reviewed"... 299

The Society is not responsible for any statements made or opinions expressed in its publications.

Reprints from this publication may be made on condition that full credit be given CIVIL ENGINEERING, *the author, and date of publication.*

SUBSCRIPTION RATES

Price, 50 cents a Copy; $5.00 a year in advance; $4.00 a year to Members and to Libraries; and $2.50 a year to Members of Student Chapters. Canadian postage 75 cents and foreign postage $1.50 additional.

Entered as second class matter September 23, 1930, at the Post Office at Easton, Pa., under the Act of August 24, 1912.

COPYRIGHT, 1931, BY THE AMERICAN SOCIETY OF CIVIL ENGINEERS
Printed in the U. S. A.